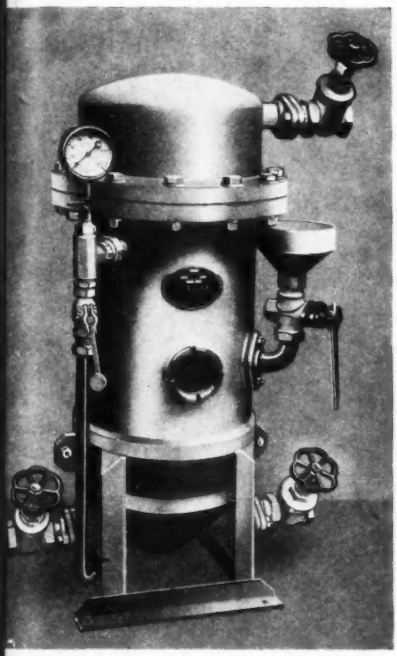
ECHNOLOGY DEPT.

The Chemical Age

VOL LXIII 23 DECEMBER 1950 No 1641

PUBLIC LIBRARY
JAN 6 1951
DETROIT



WRITE WITH DETAILS OF YOUR FILTRATION PROBLEM

THE STELLAR FILTER

Water of highest physical purity
Plating solutions
Fine Chemicals and Pharmaceuticals
Waxes — oils — essences
Rolling Oils in circulation
Photographic Chemicals
Synthetic Resin Solutions
Solvents — Varnishes

THE PATERSON ENGINEERING CO. LTD
63 WINDSOR HOUSE · KINGSWAY · LONDON · WC2

BROWNS

FOUNDRY Co. Ltd.

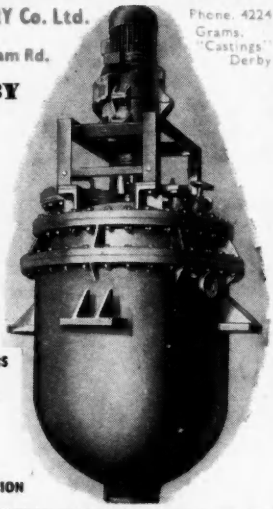
Nottingham Rd.

DERBY

Est. 1868

Phone: 4224

Grams: "Castings" Derby



CHEMICAL PLANT TO SUIT CUSTOMERS DESIGNS AND SPECIFICATION

ACIDS

*NEW BUYERS ESPECIALLY INVITED

- METAL FINISHING
  NITRIC, HYDROCHLORIC, SULPHURIC, DIPPING ACIDS & SUNDRY CHEMICALS
- PROCESS ENGRAVING
  NITRIC ACID, IRON PERCHLORIDE (LIQUID OR SOLID) SUNDRY CHEMICALS
- GARAGES, ETC.
  ACCUMULATOR ACIDS (ALL STRENGTHS) DISTILLED WATER

GEO. F. BOOME & SON LTD.

STAR CHEMICAL WORKS
WATTS GROVE, BOW, E.3
PHONE EAST 2264-5

Filter Crucibles
of
Porous Porcelain

retain the finest precipitates and filter rapidly. They are not affected by acids, remain constant in weight within very fine limits and can be heated to high temperatures.

Made by
The **WORCESTER ROYAL PORCELAIN CO. LTD.**
and
Supplied by all recognised Laboratory Furnishers

PUMPS

FOR ALL PURPOSES

Centrifugal and Diaphragm
1½" to 4" dia.

PETROL, ELECTRIC OR HANDPOWER
NEW AND RECONDITIONED.
SALE OR HIRE.

RING GREENWICH 3189

THE GREENWICH PUMP & PLANT CO., LTD.
DENHAM ST., GREENWICH S.E.10

BROTHERHOOD

Craftsmanship

A Guarantee WHEN CONTINUOUS OPERATION IS ESSENTIAL

high pressure
Compressors

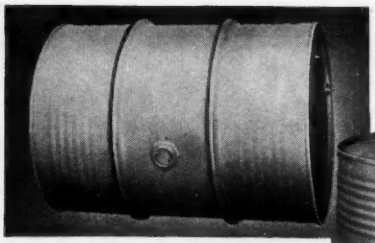
Brotherhood Compressors absorbing up to about 4,000 B.H.P. each, in this, the largest high pressure Gas Compressing Plant in Europe.

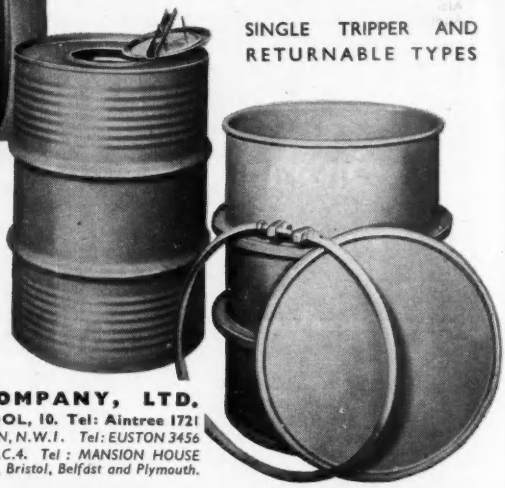
PETER BROTHERHOOD LTD
PETERBOROUGH · ENGLAND
COMPRESSOR & POWER PLANT SPECIALISTS FOR NEARLY A CENTURY

"BRABY" REGD.

Steel Drums

SINGLE TRIPPER AND RETURNABLE TYPES





Our factory at Liverpool is designed and equipped for the production of high grade steel drums of many types, which can be supplied Painted, Galvanized, Tinned or Lacquer lined. Certain types can also be made from Stainless Steel

One of the wide range of

BRABY

PRODUCTS

FREDERICK BRABY & COMPANY, LTD.

HAVELOCK WKS., AINTREE, LIVERPOOL, 10. Tel: Aintree 1721

FITZROY WORKS, 352-364 EUSTON RD., LONDON, N.W.1. Tel: EUSTON 3456

EXPORT: 110, CANNON STREET, LONDON, E.C.4. Tel: MANSION HOUSE 6034.

Also at Glasgow, Bristol, Belfast and Plymouth.

CHEMAPOL

Ltd,

Company for the Import and Export of Chemical Products and Raw Materials

PRAGUE II, PANSKÁ 9

CZECHOSLOVAKIA

Cables: Chemapol Praha

Telephone: 279-44/47

Teleprinter: Praha 286 Chemapol

Exports of Czechoslovak:

Ammonium and Sodium Bicarbonate
Charcoal/Hardwood and Medicinal/
Citric Acid and Citrates
Formic Acid
Lactic Acid
Cresylic Acid
Pure Naphthalene
Crude Montan Wax Bohemia brand
Lithopone
Lacquers and Enamels
Bleaching Earth
Textile Auxiliary Products
Potash Chrome Alum
Ultramarine Blue
Rongalite
Cosmetics and Candles
Pharmaceuticals
Saccharine PAGODA brand
and a wide range of other chemicals.

INDEX TO ADVERTISERS IN THIS ISSUE

	Page
Altrincham Jute Ltd.	895
Audley Engineering Co. Ltd.	891
Baker Perkins, Ltd.	vii
Blackwell's Metallurgical Works, Ltd.	895
Boome, George F. & Son, Ltd.	Cover ii
Braby, Fredk. & Co., Ltd.	ii
Brotherhood, Peter, Ltd.	i
Browns Foundry, Co., Ltd.	Cover ii
Callow Rock Lime Co., Ltd., The	Cover iii
Chemapol, Ltd.	ii
Chemical Engineering & Wilton's Patent Furnance Co., Ltd. (The)	iv
Clark, T. & C., & Co., Ltd.	Cover iv
Classified Advertisements	896, xiii & xiv
Danks of Netherton, Ltd.	x
Electroflo Meters Co., Ltd.	viii
Electro-Power Service Co. (The)	iv
Farnell Carbons, Ltd.	895
Fielding, T. H., & Sons, Ltd.	iv
Geigy Ltd.	x
Girling, S., & Sons, (Coopers), Ltd.	xv
Greenwich Pump & Plant Co., Ltd. (The)	Cover ii
Harris, Francis W. & Co., Ltd.	xvi
Holmes, W. C. & Co., Ltd.	iii
Imperial Typewriter Co., Ltd.	xii
Jackson, E. & Co.	xvi
Jobling, James A., & Co. Ltd.	v
Kent, James, Ltd.	Cover iii
Kestner Evaporator & Engineering Co., Ltd.	vi
Kilner, John & Sons (1927), Ltd.	xvi
Leda Chemicals, Ltd.	viii
Lennox Foundry Co., Ltd.	xvi
Lord, John L.	Cover iv
Marsh, David (Manchester), Ltd.	895
Mirvale Chemical Co., Ltd.	Cover iii
National Enamels, Ltd.	xvi
Negretti & Zambra, Ltd.	viii
New Metals & Chemicals, Ltd.	895
Paterson Engineering, Co., Ltd. (The)	Front Cover
Pott, Cassels & Williamson	xiv
Pulsometer Engineering Co. Ltd.	xii
Reads, Ltd.	ix
Robinson, F. & Co., Ltd.	893
Scientific Glass Blowing Co. (The)	iv
Solway Flowrators	viii
Spencer, Chapman & Messel, Ltd.	v
Staveley Iron & Chemical Co., Ltd. (The)	xv
Steel Equipment Co., Ltd. (The)	xvi
Tanks & Linings, Ltd.	xi
Watford Chemical Co., Ltd. (The)	iv
Worcester Royal Porcelain Co., Ltd.(The)	Cover ii
Yorkshire Tar Distillers, Ltd.	vi

AIR BLOWERS FOR INDUSTRY

DELIVERED FROM STOCK
in capacities up to 140 c.f.m. against 3 p.s.i. and up to 65 c.f.m. against 5 p.s.i. Larger Blowers to order.
Send for Brochure No. 30.

W. C. HOLMES & CO. LTD., HUDDERSFIELD
Telephone : 5280 (Six Lines)

HOLMES HUDDERSFIELD

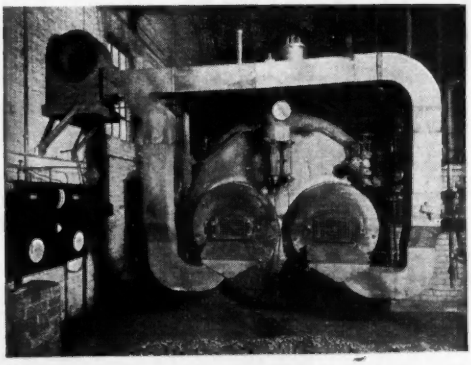
RESEARCH GLASS APPARATUS
HIGH VAC. TAPS

Standard Ground Joints
Silica, Porcelain, Rubber and Graduated ware.

THE SCIENTIFIC GLASS BLOWING CO.
Sole Add.—12-14 Wright Street, Oxford Road, Manchester, 15.
Te'egrams : SOXLET M/C. *Telephone* : ARD. 1425

One more worry gone !
You are now independent of scarce and expensive imported watch oils
WATFORD's *fine* LUBRICANT
IN BOTTLES
appr. ½ *oz.* @ 1/8*d. Post* 4*d.*
appr. 4 *oz.* @ 6/6*d. Post* 6*d.*
is tailor-made for the most delicate mechanisms, is in free supply and realistically priced. Newly developed ingredients give excellent lubrication, complete freedom from gum formation and rancidity. Larger quantities for wholesale on request. BY THE MAKERS OF "ESTAX" EMULSIFIERS AND OIL ADDITIVES.
WATFORD CHEMICAL Co. Ltd.
Head Office: 22/32, Copperfield Rd, E.3
Tel: Advance 2604/6
West End Office: 30, Baker St, W.1.
Tel: Welbeck 0264

OVER 40 YEARS EXPERIENCE



IN THE MANUFACTURE OF FORCED DRAUGHT FURNACES FOR CHEMICAL WORKS STEAM BOILERS AND STILLS

Burning Fuels of any type and size

THE CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE COMPANY LIMITED. HORSHAM, SUSSEX.

Northern Office and Fuel Engineer
T. G. Fegan, Cannonfield,
Hathersage, Nr. Sheffield.
'Phone Hathersage 333

'Phone : Horsham 965
'Grams : Evaporator

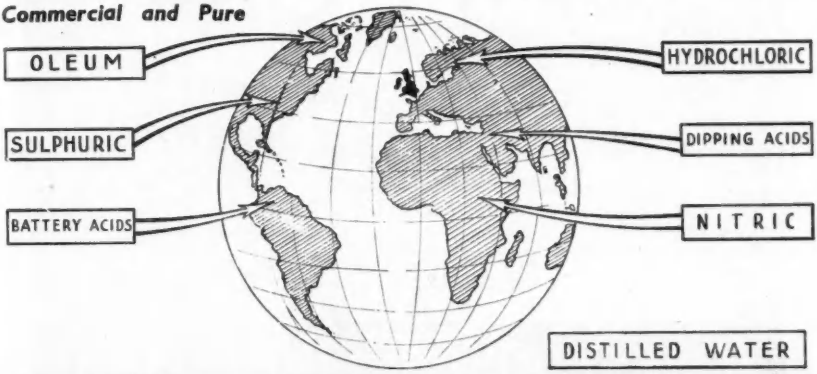
ELECTRIC
MOTORS
REWOUND REPAIRED MAINTAINED
Bought, Sold or Exchanged
THE ELECTRO-POWER SERVICE CO.
15-17 HOWARD ROAD, LEYTONSTONE, E.11
Phone : MARYLAND 2788

Empty Barrels & Drums
GENERAL AND EXPORT COOPERS AND DRUM RE-CONDITIONERS
T. H. FIELDING & SONS LTD.
KNOSTROP LANE, LEEDS 9
Phone · 22675 & 26394 Branch Works at Hull

ACIDS

Delivered in any quantity TO ANY PART OF THE WORLD

Commercial and Pure

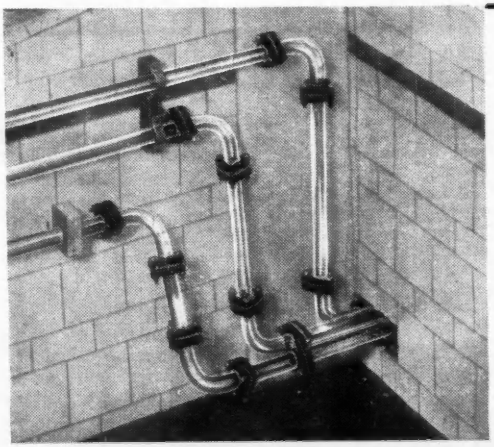


SPENCER CHAPMAN & MESSEL, LTD.

33, CHANCERY LANE, LONDON, W.C.2

Telephone: HOLBORN 0372 (3 lines) Telegrams: "Hydrochloric, Holb., London."

Works: SILVERTOWN, E.16



Pump through Glass!

— it's cleaner! safer!

Visibility of product is an aid to quality maintenance.

OUR photograph shows part of an installation in a large mineral water factory at Trafford Park, Manchester, in which PYREX Brand Glass Pipe Lines are used for conveying syrups from one part of the factory to another, and in the bottling process.

Whatever liquid to be carried — be it acid, alkali, beer, milk, syrup or pure H_2O, PYREX Brand Glass Pipe Lines will give you the service you need.

Our glass technicians will gladly advise you, and submit drawings and estimates to suit your own particular needs.

PGI B

PYREX *Glass* **PIPE LINES**

REGD TRADE MARK BRAND

made by JAMES A. JOBLING & CO LTD., *Dept. 28, Wear Glass Works, SUNDERLAND.*

PITCH COKE

a high purity carbon for electrode manufacture and other industrial use.

Deliveries can be given in bulk or bags.

YORKSHIRE TAR DISTILLERS LTD
CLECKHEATON, YORKS.

TEL. CLECKHEATON 790 (5 LINES)

YTD

TELEGRAMS TO-YOTAR CLECKHEATON

KESTNER Laboratory and Pilot Plant EQUIPMENT

THE KESTNER LABORATORY STIRRER is a remarkably efficient apparatus indispensable to every laboratory for stirring, mixing and agitation, operated from electric light supply, direct drive without gears, with variable speed control, silent in operation and enclosed type non-metallic switch. Suitable for attaching to standard laboratory retort stand and clamp, or independent support. Write for Leaflet 233b.

THE KESTNER LABORATORY EVAPORATOR has all the unique features of the full-size Kestner Patent Multi-Circulation Evaporator. This small Evaporator is so arranged that it may be used as a single, double or triple circulating unit, making it particularly suitable for experimental work. Write for Leaflet 259.

We also have available a comprehensive range of laboratory size film driers, fractionating stills, vacuum ovens, Infra Red apparatus ideally suited to pilot plant, investigation and for educational purposes.

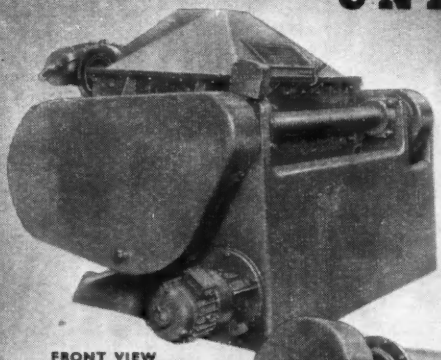
THE KESTNER LABORATORY SPRAY DRIER produces a dry powdered product of uniform texture in one operation from solutions or suspensions. It is specially arranged for easy cleaning and is suitable for handling a wide range of products. Each unit is complete with heater, fan, dust collector, driving motor, and all necessary equipment. Write for Spray Drier Leaflet 264.

KESTNER'S

Chemical Engineers, 5 GROSVENOR GARDENS, LONDON, S.W.1

UNIVERSAL MIXERS

in a great variety of sizes, types and classes : for mixing under vacuum and/or pressure : from light slurries to heavy doughs : with jacketed troughs for heating or cooling : of stainless steel or other material when ingredients would contaminate ordinary iron or steel.

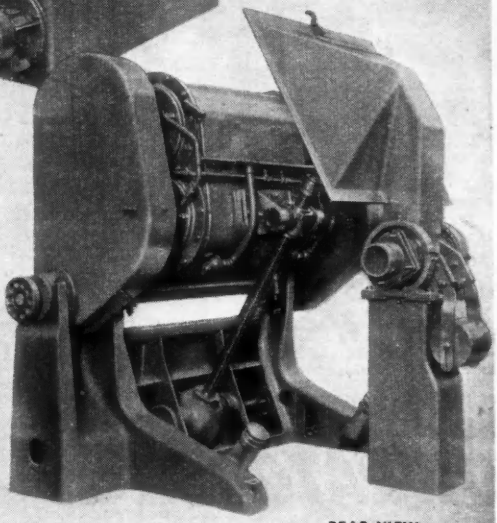


FRONT VIEW

A typical "Universal" is illustrated here. Capacity 110 gallons per mix. Note the clean design, the efficient screw tilt and the counter-balanced hood.

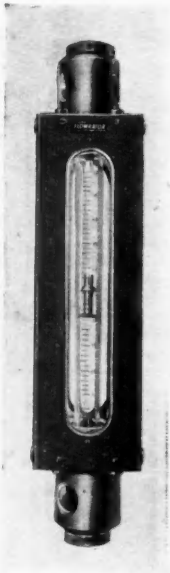
There are thousands of our mixers in use to-day many of which were built before this century.

Consult us on any special mixing problem you have and we will experiment without fee or obligation.

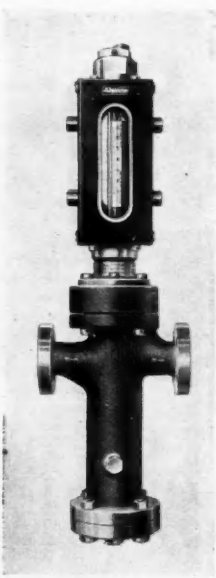


REAR VIEW

BAKER PERKINS LTD
Engineers
WESTWOOD WORKS - PETERBOROUGH



Series 100 Flowrator



Series 200 Flowrator

for measurement of flow rate of all fluids and gases – specify

Series 100 (Enclosed type)
Series 200 (Armoured type).

SOLWAY
FLOWRATORS

Connects direct into pipeline; scale is linear; response rate is high; metering element is visible. Details of Indicating, Recording, Integrating and Transmitting Flowrators available on request to:—

SOLWAY FLOWRATORS LTD.
in association with ELECTROFLO METERS CO LTD

ABBEY ROAD, PARK ROYAL, LONDON, N.W.10

BIF 1951
APRIL 30—MAY 11
EARLS COURT & OLYMPIA
SEE OUR EXHIBIT

HIGHER ALKYL CHLORIDES

Now available for the first time in this Country in Commercial quantities

LAURYL CHLORIDE
STEARYL CHLORIDE CETYL CHLORIDE
MIXED ALKYL CHLORIDES

Various Grades and Specifications including fine and broad cuts. Home and Export inquiries invited.

Details on request to the manufacturers

LEDA CHEMICALS LTD.

WHARF RD., PONDERS END, MIDDLESEX
Tel: HOWard 2231 (3 lines) Grams: Ledakem, London

N & Z

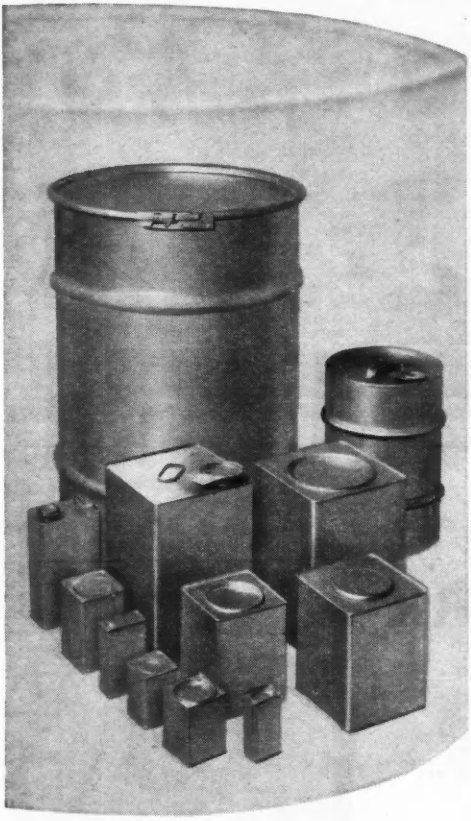
INDUSTRIAL INSTRUMENTS

for
Indicating Recording Controlling:–
TEMPERATURE
PRESSURE
HUMIDITY
VOLUME
and FLOW

NEGRETTI & ZAMBRA LTD
122 REGENT St., LONDON, W.1
BRANCHES: Birmingham, Cardiff, Glasgow, Leeds, Manchester, Nottingham
Agents in most countries overseas

Specially designed for the packaging of oils and chemicals

we are exhibiting at the 2ND national PACKAGING EXHIBITION BY PROVINCIAL EXHIBITIONS LTD JAN 30TH TO FEB 9TH NATIONAL HALL OLYMPIA LONDON



IF your product needs metal containers, Reads of Liverpool can supply them, in steel, tinplate, aluminium or terneplate, internally lacquered, enamelled, or plastic lined. Over 80 years experience in the manufacture of all types of metal containers is at your service — write for free technical advice. Reads have always specialised in meeting the requirements of the oil and chemical industries.

● CLOSURES
A wide range of pilfer-proof, air and liquid tight closures is available, easy to operate by both filler and consumer.

THE PATENT RINGSEAL PILFER-PROOF LEVER-LID TIN
This pilfer-proof closure is capped and sealed in one operation. When open the container becomes an ordinary lever-lid tin with replaceable tight cover.

● SPECIAL SHAPES
In addition to their wide variety of metal containers in the standard ranges, Reads are always willing to design containers in any shape or size required to suit your product.

● PLAIN or PRINTED
All tins, cans and drums up to 50 gallons can be supplied painted and, except for the bodies of the largest drums, printed or lithographed in full colour. If required, designs will be prepared free of charge.

● INTERNAL FINISHES
Special lacquers, plastics, metallic coatings, enamels and other internal finishes can be applied to any metal containers to ensure protection of the product.

READS OF LIVERPOOL

Mfrs. of plain or printed tins, cans and drums

READS LTD., ORRELL HOUSE, ORRELL LANE, WALTON, LIVERPOOL 9. (Aintree 3600)
Grand Buildings, Trafalgar Square, London, W.C.2. (WHItehall 5781)
Also at Birmingham, Glasgow, Belfast and Cork

R. 3121-C

CYANACETIC AND MALONIC ESTERS

We manufacture these valuable organic intermediates in commercial quantities and shall be pleased to receive your esteemed enquiries

PHARMACEUTICAL LABORATORIES GEIGY LTD., MANCHESTER, 3

934-FC.16

Let us handle your
PLATE WORK

Danks of Netherton undertake the erection of heavy steel plate work including chimneys, pressure vessels, storage tanks, gas mains, coal bunkers, and chemical plant.

DANKS OF NETHERTON LIMITED ESTABLISHED 1840

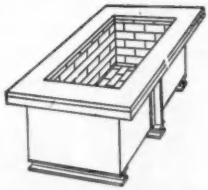
DANKS OF NETHERTON LTD.

Boilermakers & Engineers since 1840

NETHERTON, DUDLEY, WORCS. 'Phone: CRADLEY HEATH 6217
London Office: Bank Chambers, 329 High Holborn, W.C.1. 'Phone: HOLborn 2065

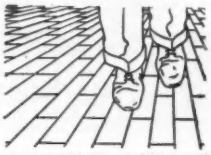
M-W. 70

acid-proof masonry construction



Acid-proof Masonry Lining for Steel Tanks.

Acid and alkali-proof chemical cements for masonry protective linings and floors are included in the NUTRALINE range of anti-corrosion materials . . . . . by selection of, say, one of the following and in connection with one of our special membranes the most stubborn acid proofing masonry problem can be solved. We supply the materials alone but also engineer and carry out complete schemes.

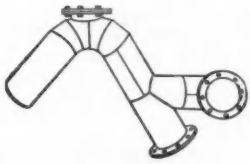


Acid -proof Flooring.

NUTRAKEY . . . . . a furane resin cement, inert to acid and alkalis, in all concentrations.

NUTRASIL . . . . . a dense, rapid setting, silicate cement, inert to all common inorganic acids, except hydrofluoric.

NUTRABOND . . . . . a plasticised, sulpur-base cement, inert to all inorganic acids, even hydrofluoric.



Technical advice readily given in the selection of the correct cement.

Nutradur Fume Hoods and Ducting.

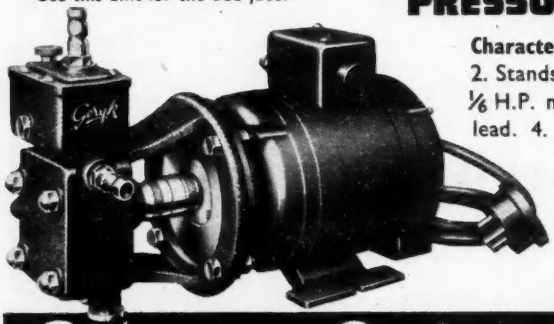
NUTRALINES TRADE MARK

TANKS & LININGS LTD.
TOWN WHARF, DROITWICH, WORCESTER.
Telephone: DROITWICH 2249/0 *Telegrams: TANKS, DROITWICH*

Pulsometer

RESEARCH WORKERS Save your high vacuum pumps for high vacuum work. Use this unit for the odd jobs.

Geryk **VACUUM** or **PRESSURE PUMPS**



Characteristics: 1. Portable. 2. Stands on the bench. 3. ⅙ H.P. motor with trailing lead. 4. Easy to clean and service. 5. Swept volume: 1 cu.ft/min 6. Vacuum ·01 M/M 7. Pressure 10lb/ per square inch.

Pulsometer Engineering Co. Ltd.,
Nine Elms Ironworks, Reading.

First

in design

Complete interchangeability of type-unit, carriage and platen, plus many new features.

performance

Distinctive work of unequalled legibility. Clear carbon copies and fine stencils.

value

Built to give the long service always associated with Imperial Typewriters.

Imperial
MODEL 60

Made throughout in Leicester by the Imperial Typewriter Co. Ltd.
There is an Imperial agent in every large town.

The
Chemical Age

The Weekly Journal of Chemical Engineering and Industrial Chemistry

BOUVERIE HOUSE 154 FLEET STREET LONDON E.C.4
Telegrams: ALLANGAS FLEET LONDON · *Telephone:* CENTRAL 3212 (26 lines)

Volume LXIII 23 December 1950 Number 1641

Monopolies and Restrictions

THE first report of the Monopolies and Restrictive Practices Commission—on the supply of dental goods—was published by His Majesty's Stationery Office on 14 December. On the same day it was announced that the next two commodities to be investigated will be (a) certain semi-manufactured products of copper and copper-based alloys, and (b) insulin. In the case of insulin, the investigation will cover supply in the United Kingdom only. In the case of the copper and copper-based alloy it will also cover exports. By the terms of reference which have been made, the Commission is required to make a report to the President of the Board of Trade on the facts of the case. The reference of insulin also requires the Commission to report about the bearing of the facts on the public interest.

The Monopolies Commission was the offspring of the Monopolies Act of 1948—the first important piece of legislation on this subject to be passed by the British Parliament for more than three centuries. It is 20 months since references were made for the Commission to investigate the supply of dental goods and its report has just appeared, and now that it has come out, there is evidence to show that the Government is having great difficulty in making up its mind what to do. The Commission has still to prepare reports on builders' castings, electric lamps, insulated cables, matches and match-making machinery—not to mention insulin and copper and copper-based alloys. It is, therefore, obvious that the Government must take steps soon to pass legislation which will give effective support to the Commission. Monopolies and near-monopolies are not hard to find and restrictive practices are quite common. It may be that the Commission will find that conditions are not so great a menace as some rabid Socialists believe, but still some restraining influence will be necessary, and it is highly likely that the Government will find that dealing with monopolies is a very complex problem.

Last Thursday's report revealed that while the dental goods industry was dominated by one company—the Amalgamated Dental group—and the Association of Dental Manufacturers and Traders of the United Kingdom, most of the charges commonly directed against monopolies were unfounded. The Commission found that the Amalgamated Dental group had used its monopolistic powers with moderation. Its report reveals, however, that it found that the group is a monopoly within the meaning of the Act. It found that there were restrictions

placed upon entry into the industry and that exclusive dealing and the collective boycott were designed to enforce retail price maintenance. During the past 15 years (the report states) nearly half the applications from manufacturers were rejected and among dealers the proportion was even higher. As the Commission decided, these restrictions are definitely against the public interest. They are the negation of free enterprise and they should be stopped. When Imperial Chemical Industries tried to oppose the monopoly and wanted to supply hospitals with material for making false teeth at a special discount, it was not allowed to do so.

A majority on the Commission would like to see legislation directed specifically against the activities of the dental trade association, but two members argued that legislation against a single industry would be unfair because many trades are guilty of the same thing. Mr. Harold Wilson has said that the Government is considering whether to legislate against monopolies one by one or to deal with all in a general act. There is something to be said about the unfairness of "picking on" one industry, but the passing of a law to prohibit exclusive dealing and collective boycott is a serious matter. Most trade associations believe that these are essential for the protection of their members. They remember only too clearly the evil days of ruthless price-cutting and (in many cases) the hopelessness of trying to compete with "dumped" or cheap imports. The Lloyd Jacob Committee last year reported against the use of collective powers to maintain prices. It also recommended that steps should be taken to make illegal the "application of sanctions which extended beyond the remedies open to any individual producers for any breach of resale price maintenance conditions." Legislation is undoubtedly necessary to prohibit monopolies acting against the public interest and this should cover industry in general rather than a few selected industries. But if this is done, would it be fair to allow the unions to limit the intake of labour into an industry and to insist upon the "closed shop"? Trade union officials claim that this control is necessary as a protection against a recurrence of the mass unemployment of the late 'twenties and to keep the "price" of labour at a reasonable level. But surely that is just what certain trade associations are endeavouring to do—to protect their members against overproduction and uneconomic prices. The Government should consider the matter very carefully before taking any drastic action.

On Other Pages

Leader:
Monopolies and Restrictive Practices . . 861
Notes and Comments:
Personality in Industry . . 863
Anhydrite—or Worse? . . 863
Christmas Greetings . . 863
Basic Chemical Stocks Lower . . 864
Measurement of Fading Colours . . 865
Italy's Chemical Progress . . 868
Fuel Economy in Steam Plants . . 869
American Chemical Notebook . . 871
Importance of Metal Pre-Treatment . 872
American Chemical Engineers Discuss New Developments . . 873
American Chemical Engineers Elect New Officers . . 874
New Fungicides for Leather . . 875
National Food Technology College for London . . 876
Physical Methods of General Food Analysis . . 877
The Nickel Industry in 1950 . . 879
Peracetic Acid . . 883
Bookshelf . . 884
Overseas News Items . . 885
Home News Items . . 886
Personal . . 887
The Stock and Chemical Markets . . 888
Technical Publications . . 889
Law and Company News . . 890

The annual subscription to THE CHEMICAL AGE is 30s. single copies, 9d.; post paid, 1s.; SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited.

Notes and Comments

Personality in Industry

THE retirement of Lord McGowan from the chairmanship of Imperial Chemical Industries, Ltd., will be regretted far beyond the ever-widening influences of the company. A man of vision and courage and a believer in unremitting, relentless work, Harry McGowan, who joined Nobel's Explosive Company in a humble position as a boy of fifteen, has become one of our greatest industrial leaders. The chemical industry is rich in firms which have in the past owed their development and expansion to the personality and initiative of their founders. Chemistry, which tends to play an increasingly important rôle, not only in the national welfare but in its influence on world affairs, will still, it is hoped, continue to attract those who not only have the expert's knowledge but also the drive and initiative required of great leaders. While having every faith in the rising generation of chemists, it is hard to see that the same opportunities await them in these days of controls and difficulties and in an industry overshadowed with the threat of nationalisation. Mr. John Rogers, who succeeds Lord McGowan, has been actively associated with I.C.I. and its predecessors for many years. He can rest assured of best wishes and confidence in his ability to carry on the great work begun by predecessors.

Anhydrite—or Worse?

THE imminent threat to Britain's supplies, caused by the American decision to curtail shipments to Europe in the new year, is (as we have said before) the subject of grave concern, both in the sulphuric acid industry and outside it. The realists—or the pessimists !—are already surveying alternative sources of the various minerals from which sulphuric acid can be made. Chief and most attractive of these is anhydrite. Deposits in Great Britain are large. Sulphuric acid processed from anhydrite is of high quality and there is the added advantage that a useful by-product, Portland cement, can be made from the residue. Unfortunately, the cost of building new plant is going to be high. The capital outlay involved will impose a fresh burden upon the chemical industry and upon the long-suffering public, the more especially since Marshall Aid is soon to stop. If, as is likely, the Government provides some assistance to firms who wish to build plant to use alternative raw materials for sulphuric acid production then the burden may be greater still. The tax payer will then have to finance the project directly. Happily there is a chance that improvisation may be largely avoided. The OEEC commission, now in Washington, may be able to persuade the U.S. Government to increase the export allocation of sulphur to the United Kingdom. The international situation may provide a convincing argument in Great Britain's favour. But, unless quick, decisive action is taken one way or another, then sulphuric acid is going to be very scarce for some time. The long-term policy of producing sulphuric acid from anhydrite needs to get under way now, if Britain's further economic recovery is not to be severely handicapped.

CHRISTMAS GREETINGS

The editor and staff would like to wish all readers the happiest and most enjoyable Christmas they have ever had. They would also like to thank contributors, correspondents, association and society secretaries, public relations officers and all others who have helped them produce each week what they hope has proved an interesting and informative issue. Finally, they would like to express their appreciation to all those who have sent them Christmas greetings in one form or another and to express their regrets that pressure of work has not made it possible for them to personally acknowledge receipt of these.

Basic Chemical Stocks Lower

Some Improvement in Production

DESPITE some improvement in production during September, stocks of basic chemicals and non-ferrous metals were generally lower than in the same month of 1949. Reserves of sulphur, the future of which is causing considerable concern, were only (in thousands of tons) 77.3 compared with 91.5 last year. Other reductions in stocks (in thousands of tons) included: Molasses for distilling (cane and beet) 174.0 (221.8); industrial alcohol (million bulk gallons) 0.32 (3.91).

In production a higher yield was recorded in a number of basic materials, including (in thousands of tons) sulphuric acid 147.5 (139.1); and (million bulk gallons) industrial alcohol 3.14 (1.91).

Estimated numbers employed in all sections of the chemical and allied trades in September totalled (in thousands) 453.0 which was 3.9 higher than the previous month and 11.0 more than in September 1949. Distribution of workers was: Coke ovens, chemicals and dyes, explosives, etc., 260.9 (192.3 men, 68.6 women); pharmaceutical, toilet preparations, etc., 85.2 (43.5 men, 41.7 women); paint and varnish 39.0 (27.7 men, 11.3 women); mineral oil refining, other oils, greases, glue, etc., 67.9 (54.6 men, 13.3 women).

These figures and the details given below are abstracted from the current issue of the *Monthly Digest of Statistics*, No. 59, November 1950 (HMSO, 2s. 6d.).

BASIC CHEMICALS IN SEPTEMBER

	September, 1950 Thousand Tons			September, 1949 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	147.5	156.0	—	139.1	144.0	—
Sulphur	—	29.1	77.3	—	26.2	91.5
Pyrites	—	13.8	73.9	—	17.6	76.0
Spent oxide	—	16.0	189.1	—	14.6	173.8
Molasses (cane and beet)	12.8	50.2†	174.0	11.7	25.9†	221.8
Industrial alcohol (mil. bulk gal.)	3.14	3.34	0.32	1.91	2.27	3.91
Ammonia	—	7.11*	9.77	—	6.46*	4.20
Superphosphate	14.2	15.1	—	17.1	18.7	—
Compound fertiliser	147.7	109.0	—	162.8	143.2	—
Liming materials	—	443.9	—	—	546.7	—
Nitrogen content of nitrogenous fertilisers	20.42	18.35	—	19.70	22.28	—
Phosphate rock	—	74.0	329.6	—	84.9	255.2
Virgin aluminium	2.41	18.2	—	2.44	15.2	—
Virgin copper	—	33.4	121.4	—	31.0	145.2
Refined lead	6.55	15.6	71.2	2.44	17.4	63.4
Tin	2.50	2.96	—	2.28	2.41	23.5
Zinc concentrates	—	12.4	87.1	—	13.8	63.4
Magnesium	0.38	0.42	—	0.24	0.35	—
Pig iron	187.0	148.0	579.0	185.0	139.0	500.0
Steel ingots and castings (including alloys)	326.0	—	1,160.0	306.0	—	1,331.0
Rubber: Reclaimed	0.67	0.70	2.16	0.41	0.47	2.65
Natural (including latex)	—	5.88	40.3	—	3.73	47.4
Synthetic	—	0.06	0.88	—	0.05	1.45

* Average of five weeks. † Distilling only.

Visit to Research Institute

ONE HUNDRED and thirty pharmacists and doctors attended the "At Home," given by the scientific staff of Evans Medical Supplies, Ltd., in the Evans Biological Institute, Runcorn, on 13 December. The guests, from Liverpool, Warrington and Chester, were shown through the research and testing laboratories and saw demonstrations of the preparation and testing of modern biological products such as Heparin, Hyaluronidase, Cytochrome C and Vitamin B_{12}. There was also a display of techniques and developments in the preparation, standardisation and control of various medical, veterinary and pharmaceutical products.

World Tin Output Increased

WORLD production of tin is expected to reach a new post-war record of between 164,000 to 165,000 tons this year, compared with 162,300 tons in 1949.

Malaya's contribution this year, as leading world supplier, is estimated at about 58,000 tons. This is an increase of some 3000 tons over the 1949 output. About 46,800 tons has gone to the U.S.A., providing a dollar income of over $100 million.

Indonesian output with a total of 32,000 tons also shows an increase of 3000 tons over last year's figures.

World consumption is estimated for the year at between 148,000 to 150,000 tons.

MEASUREMENTS OF FADING COLOURS

ADVANTAGES of the spectro-photometer over other methods of measuring colour were emphasised by Mr. E. Waters, B.Sc., in an address on the application of the recording spectro-photometer in some colour problems to the London Section of the Oil and Colour Chemists' Association held on 13 December at a meeting presided over by the chairman, Mr. Leslie O. Kekwick.

Illustrating the instrument, Mr. Waters said that it was to be preferred to other systems because it was an objective form of measurement, independent of the operator and relying only on physical measurements and suitable calculations afterwards.

The device consisted of a spectrometer and a photometer. With it was measured the reflection of a coloured material or the transmission of a transparent medium, and the light that was reflected or transmitted in different regions of the spectrum.

The source of light was an ordinary tungsten filament lamp. There was a lens system, a glass prism, which split the white light into the different colours and wavelengths of the spectrum; then it fell on a mirror which reflected the light to the exit slit of the spectrometer portion; and in front of the mirror was a sharp knife-edge which isolated a narrow beam of the spectrum, and it finally emerged from the exit slit. Thus there was a means of obtaining one beam of light which eventually, by suitable prisms, was split into two.

Standard Magnesium Block

A standard magnesium block was used which reflected all the light which came on to it, and that was used as a reference. One of the two beams of light fell on the standard white, and the other fell on the coloured specimen. A continuous record was obtained on a chart on a revolving drum, from zero to 100 per cent reflectance.

Mr. Waters illustrated a physical pattern of the amounts of light reflected from a panel in the different regions of the spectrum. Since the pattern was due entirely to the selective reflection of the different regions of the spectrum, one thus obtained a complete measure of the physical properties of that pattern which gave rise to its colour.

But that was not sufficient. Having done all that was necessary by measurement, there arose the problem of interpretation. The effect of the different wavelengths on the colour response of the human being had to be considered.

In investigating a wide range of pigments it was considered advisable to have some objective means of measuring their fading properties, and the reflection of panels was measured after different periods of exposure. The light fastness of the pigments were not assessed by means of the curves obtained, but nevertheless a permanent record was achieved of the appearance of the panels at different stages during fading.

Expressed in Terms of Primaries

Most colours could be matched by a suitable mixture of three primaries, continued Mr. Waters. Any colour could be expressed in terms of those three primaries. It was also possible to calculate from those primaries what value would be obtained from any other three primaries. Actual measurements could be made of all the individual wavelengths comprising the spectrum; and if that could be done the specification could be derived for any mixture of wavelengths which might be reflected by a pattern.

The real problem in illustrating the plotting of colours in terms of a chromaticity diagram was to correlate results with the practical differences seen. The work of a number of investigators in this field was discussed, particularly attempts made to calculate just noticeable differences, taking into account differences of lightness and darkness.

To give an idea of the magnitude of those differences, Mr. Waters showed colour photographs of a number of patterns. Each photograph was divided into three panels. In the first and second variation was by ten noticeable differences, and in the second and third by 20 noticeable differences. The effect of a just noticeable difference in yellow was shown to be much greater than a just noticeable difference in blue. Reference was also made to the Munsell chart, illustrating differences in hue.

In some fairly recent work an attempt was made to examine a series of pigments for light fastness standards in replacement of wool patterns. A number of pigments were faded for various periods; by spectro-photometric records a number of percentible steps were separated and plotted for different pigments against time. The investigation was made in connection with some work for submission to O.C.C.A. for light standards.

In another connection the whiteness of certain paints was investigated, the purpose being to examine the yellowing and

loss of whitening generally of various resins. A number of experienced colour observers assessed the panels in order of whiteness, and an attempt was made to arrive at some correlation between the whiteness of the panels and physical measurements made by various methods.

A fact which stood out was that it was not the actual amount of light in terms of visual sensation which was so important, but the deviation of the white from an uncoloured appearance to a coloured appearance. Since the main deviation from white was towards yellowness, that was why simple reflection technique, particularly where reflection at the blue end of the spectrum was used, gave such a high degree of correlation between observed results and measurements.

Problem Important

The problem of the measurement of colour, concluded Mr. Waters, was very important, and there was very great need for colorimetric work in most colour using industries. Considerable problems remained, and without question the major one was the lack of detailed information on the colour solid from the psychological point of view.

In the discussion that followed Mr. R. F. G. Holness said that he was interested to note that, after Mr. Waters had gone to the trouble to produce a very beautiful spectro-photometric reflectance curve he had found that in order to handle it he had to introduce a high standard observer to get the thing back into some numbers that could be dealt with.

Presumably there was some very good reason for that, because it seemed to him that to introduce a subjective means of evaluation derived from an objective one was, on the face of it, a retrograde step. He had often hoped that it might be possible to express fading in terms such as areas under curves or those related with the degrees in height of the reflectance at the dominant wavelength, and so on.

Mr. Waters pointed out that ultimately we were concerned to measure colour in order that we could obtain a quantitative measure of what we saw. After all, the eye was the judge; the ultimate criterion was that of visual differences. But we had no means of expressing visual or human differences independently.

In dyestuffs there was an enormous range of fastnesses and a wide range of different types of fading; different textile finishings could also affect the behaviour of a single dyestuff. He mentioned an orange dyestuff which was very popular for viscose rayon, and which went brown when it faded. We had, therefore, to assess how fast it was, taking into account the objectionable nature of that brownness. An ordinary spectro-photometric curve would not do, and we had to relate it to visual appearance.

When the problem was dealt with by a number of observers of known colour vision we adopted a mean as the official standard, and from that we could say that by measurement we had made a difference of one noticeable step or ten noticeable steps away from the original pattern in terms of the standard observer. He agreed that that was based on subjective data; but we were dealing with subjective phenomena. Some people would not like a yellowish white and he preferred a pinkish to a yellowish white. Unless we took account of such differences we could not solve the problem.

The possibility of giving an idea of the reproducibility of the results shown was raised by Mr. N. L. A. Pollards, who also asked if a comparison could be given of the sensitivity of the instrument in various colour regions with the sensitivity of the normal person.

Information of that nature was lacking, replied Mr. Waters. He was, he admitted, sceptical about the physical instruments, although he used them so much, and he had a wholesome appreciation of the sensitivity of the human eye; it was fantastically sensitive, particularly to hue, and not so much to lightness.

Eye Better than Instrument

For slight differences in tone in certain regions, the eye was certainly better than the instrument. The Americans did not appear to stress that very much, and in that respect he felt they were wrong. The instrument he used gave extremely reproducible results. But an enormous amount of work remained to be done, because we had no detailed information of all the colour solids either for the instrument or for the eye.

Dr. R. F. Bowles commented that the paper was very much more important than its title revealed. One wondered whether the author would consent to alter the title when it was published, because in the main he had dealt with the physical measurement of the fading of colours, which was practically a new subject and one of extreme importance in the paint and allied industries.

Presuming that the excellent colour illustrations that had been shown were obtained with the Hardy instrument, he said that even if we could afford to buy them we could not obtain them.

Pharmaceutical Uses for Para-Aminobenzoic Acid

THE esters of para-aminobenzoic acid, particularly the salts of its ethyl, η-butyl, β-dimethylaminoethyl, and γ-di- η-butylaminopropyl esters possess local anaesthetic properties and are of considerable value in medicine. The acid itself is also used in organic synthesis for the production of fine chemicals. Comparatively recently, attention has been given to the study of para-aminobenzoic acid as a constituent of the vitamin B complex and to the use of the acid or its sodium salt in the treatment of various diseases. Of particular importance is the recent work which has been done on the effect of the acid on the growth of man and animals. According to the Dispensatory of the U.S. (24th Edition, p. 1541 (1947)) and Ansbacher *et al*; Federation Proceedings (98 (1942)), this aromatic carboxylic acid has a beneficial effect on the growth of man and the higher animals. It appears to stimulate appetite and causes a general improvement in health. Para-aminobenzoic acid in small doses stimulates the growth of microbes and in larger doses hinders their development (Lecoq, Raoul and Solamides J.; Compt. rend 226:846-848 (1948)). At dilutions of 1:130 and 1:250 the sodium salt has definite bacteriostatic properties. Some use has been made of para-aminobenzoic acid for restoring the colour of greying hairs in human beings and as a preventive of nutritional achromtrichia (Martin, C. J., and Ansbacher, S.; J. Biol. Chem. 138; 441 (1941)) and others.

Reduction Method

Para-aminobenzoic acid is obtained by reducing the nitro-acid with such reagents as zinc and acid, ammonium sulphide and alkaline ferrous hydroxide. As a class the amino-benzoic acids are interesting on account of their amphoteric properties and their similarity to glycocoll in chemical character. The para acid in the pure state is a white or faint yellowish, fluffy, needle-crystalline powder, which is slightly soluble in cold water, and more soluble in hot water; freely soluble in alcohol and in ether. An 0.5 per cent aqueous solution of the acid has a *p*H 3.5-4.0. The melting point of para-aminobenzoic acid is 187-189° C. The sodium salt is a white to buff-coloured odourless, crystalline powder possessing a saline taste. It contains half a molecule of water. Sodium para-aminobenzoate is freely soluble in water, slightly soluble in alcohol, very slightly in benzene and in chloroform and practically insoluble in ether. The *p*H of a 0.5 per cent solution is 7.5-8.0.

The para acid possesses a very low toxicity index. Scott and Bobbins (Proc. Soc. Exp. Biol. 49:184 (1942)) found that the lethal dose for animals was about 2.8 gm. per kilo of body weight. In one repeated treatment of endemic typhus patients received doses up to 219 gm. of the acid over a period of eight days without having any manifestations of toxicity. The acid and its sodium salt are compatible with penicillin but have a harmful effect on the sulphonamides.

The Chemical Age Year Book

PRESENT day shortages and difficulties combine to make the maintenance of a high standard of production increasingly hard, and there is a tendency to accept the mediocre or less good, as the best which can be expected.

It is, therefore, a pleasure to see the high quality of THE CHEMICAL AGE YEAR BOOK for 1951, which in its specious maroon cover and gold lettering, is now being dispatched to subscribers.

The contents once again make available in compact form a quantity of useful data about materials, sources of plant, and technical, commercial and legal affairs. There are lists concerned with the principal chemical and allied organisations, research associations and administrative groups. Current literature for chemists is summarised and there is a comprehensive collection of chemical and metallurgical journals.

Among the new features are a survey of some new plastics and their applications; prospects for atomic power are reviewed; and the toxic factor in DDT is considered.

The Buyers' Guide, which has been considerably enlarged, remains one of the most informative directories for sources of plant, instrument and chemicals.

In the advertising, there are a number of striking colour pages.

The volume as usual contains a diary, and calendars for the current year and 1952.—J.A.Y.

ITALY'S CHEMICAL PROGRESS

1949 In Retrospect

THE chemical industry in Italy showed a fairly substantial progress in 1949 compared with the previous year. While prices tended to decline, in some cases the production indices (presumably based on weight) exceeded the figure of 100 taken as the pre-war (1938) standard. June and July were notable for the monthly general indices reaching 102, but for the remainder of the year they were about 90.

In the general survey of 1949 recently published by the ANIC (Assoc. Naz. dell' Industria Chim.) and the Istituto Centrale de Statistica details were given of some of the principal chemical products.

Fluctuated Widely

Contact sulphuric acid fluctuated rather widely from month to month but averaged 32,500 tons per month for the year, during which a new plant began operations. Chamber acid also showed wide variations reaching a peak of 69,000 tons in July and a monthly average for the year of 64,500 tons.

Home demand was good and exports exceeded those of 1948, mostly going to Austria. Total production of acid (chamber and contact) at 1.15 million tons was a little over that of 1938.

Among various inorganic salts for industry, boric acid and borax regained their pre-war level, and damage to the principal centre at Lardarello (fumaroles or hot springs, etc.) has been completely repaired. There has been remarkable recovery in exports, especially to central-eastern Europe. Sodium sulphate prices tended to decline owing to competition at home and abroad; while sodium sulphide was affected by restrictions in the electricity service, and exports declined.

Output of chromates and bichromates averaged 3000 tons a year and was mainly limited to the home market, as it was not possible to compete with principal foreign producers. Even so the 1949 figures greatly exceeded those of 1938.

Alkali production in practically all branches declined during the first part of the year, but showed some recovery later. Caustic soda, including electrolytic, totalled 176,000 tons—slightly above 1938 but much below 1948 as regards electrolytic; soda ash (anhydrous carbonate) was nearly 400,000 tons (350,000 tons, 1938). Exports of caustic were less, with reduced demand from India and Pakistan. Liquid chlorine exports showed a marked increase, especially to France and the Benelux countries.

Calcium carbide registered a remarkable decline, again owing to the shortage of electric power. Output was only 83,000 tons (145,000, 1948, 135,000, 1938), and exports were practically nil.

In the fertilisers group, 100 per cent synthetic ammonia averaged about 11,500 tons per month, an increase over both 1938 and 1948; total N_2 was 110,000 tons; phosphates (as P_2O_5) were 250,000 tons, or about the same as 1938; and copper sulphate was 75,000 tons, as compared with 125,000 tons in 1938.

Manufacture of dyes has been somewhat discouraged by foreign competition. Phthalic anhydride started the year fairly well, but demand and prices subsequently declined. Electric power shortage affected the production of methanol with consequent influence on formaldehyde. Output capacity for the former was about 24,000 tons and for the latter 20,000 tons per annum.

Acetic acid was subjected to severe home competition and limited demand with falling prices. Total capacity was about 30,000 tons. There were some imports from Switzerland and exports to France, Spain, Egypt and the Far East.

Among solvents, acetone was in strong demand and exports to France could not be fully supplied. Despite the high quality and prices conforming to the international level, however, U.S. competition was severe both in home and foreign markets. There were also large imports from England.

Consumption Figures

Some figures given of Italian consumption of solvents, included (in tons): acetone, 3500; butyl alcohol, 1200; alkyl acetates, 4000. Production of synthetic resins and plastics exceeded the pre-war level, and so far as the urea type was concerned the position was said to be fairly satisfactory, but imports of styrene, polystyrene, and polyvinyl chloride—particularly from the U.S.A.—were considerable. Home consumption of resins and plastics was estimated at about 8500 tons annually.

Of the raw material required for soap making some 30,000 tons was home-produced (sulphur, olive oil, tallow, bone grease, etc.) and 60,000 tons imported.

FUEL ECONOMY IN STEAM PLANT

The Use of Special Condensate Pumps

ALTHOUGH great thought and care is usually taken in the design and layout of boiler installations to ensure that a high efficiency is obtained, it is still quite common practice to return the condensate to the boilers from a hot well.

Various types of pre-heating, the use of special furnaces, stokers, and economisers, etc., all play their part in reducing the fuel to steam raised ratio, nevertheless, the most important factor has been overlooked, mainly because a condensate pump of suitable design has not been available.

Reference to Figure 1 of a typical steam plant layout, will show :—

(1) A loss due to the reduction of condensate from the boiler pressure temperature to atmospheric pressure temperature (212° F. (max.).

(2) The necessity for providing additional make up water due to (1).

(3) A loss due to the fluctuation in the rate of returning feed water to the boiler.

That these several losses greatly impair the overall efficiency of the boiler plant and the process plant when considered as a whole, is shown in the calculations to follow. First, however, refer to Figure 2, which diagram clearly shows the layout of a closed circuit, accelerated system. In this system it will be seen that :—

(1) The collecting main for the condensate, being part of the circuit, prevents all loss due to evaporation.

(2) As the pump only returns that which is used, the water level in the boiler remains constant.

(3) The simplicity of the system reduces prime cost and maintenance work.

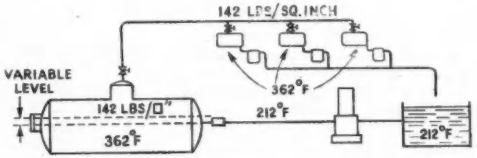
A comparison between the two systems is shown in the following calculations which are based on the use of steam generated at a pressure of 142 lb. sq. inch.

(1) LOSS DUE TO DIFFERENCE OF FEED WATER TEMPERATURE

Steam temperature at 142 lb /sq in. effective boiler pressure = 362°F.
Total heat of steam at 142 lb./sq. in. effective boiler pressure ... = 1,210 B.T.U./lb.
B.T.U. per lb. of water ... = 1,210 − 182 = 1,028 (Fig 1)
B.T.U. per lb of water ... = 1,210-333 = 877 (Fig 2).
Difference 1,028 − 877 ... = 151 B.T.U. = 14.9 which is a total loss in the plant layout shown in Fig. 1.

(2) LOSS BY EVAPORATION

Total heat of water at 212°F.... = 180 B.T.U./lb.
Latent heat of evaporation ... = 980 ,, ,,
Total heat of steam ... ... = 1,160 ,, ,,
Temperature of water in boiler at 142 lb./sq. in. ... ... = 333°F.
Loss is $\frac{151}{980}$ ... ... = 0.155 lb./lb. of steam
Loss per cent ... ... = 15.3



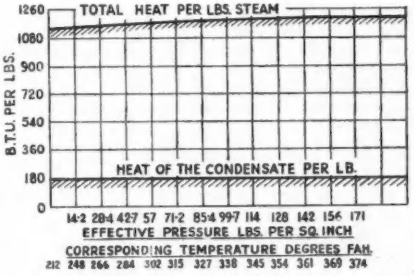


Fig. 1: The vertical ordinates corresponding with the different pressures of the hatched surface represent the B.T.U. per lb. of steam with feed pump and condensate hot well

Heat required to replace this loss 0.155 × 180 ... ... = 27 B.T.U./lb.
Therefore 333 − 27 ... = 306 B.T.U./lb.
and 0.155 lbs. will require 306 × 0.155 ... ... = 47 B.T.U./lb.

(3) TOTAL SAVING IN CLOSED CIRCUIT SYSTEMS.

Due to temperature ... ... = 151 B.T.U./lb.
Due to evaporation ... ... = 47 ,, ,,
Total saving 151 + 47 ... = 198 ,, ,,
Total saving per cent

$$= \frac{\text{B.T.U. saved}}{\text{B.T.U. produced}} = \frac{198}{1,028} = 19.4$$

The actual economy is considerably

greater than the calculated saving shown above, since:—

(1) The temperature of water in the hot well is always below 212° F.
(2) The water level in the boiler is constant.
(3) The loss occasioned by the use of steam traps is eliminated.
(4) The boilers operate at constant temperature.

Practical tests have shown that the actual economy effected is from 50 per cent to 100 per cent more than the theoretical figures shown above. For instance, on a plant operating at 100 lb./sq. inch, the actual saving was 32 per cent against the theoretical 15 per cent.

The successful operation of the closed circuit accelerated system is dependent upon a pump having the following features:—

(1) It must be positively self-priming.
(2) It must handle any mixture of steam and water.
(3) It must run without passing any condensate.
(4) It must immediately deliver condensate after running idle.
(5) It must operate at high temperatures.

In order to set out the principles of the two systems in the simplest possible manner, all variations of layout and uses of the steam have been neglected. As an example, it frequently happens that process steam is used at lower pressure than the boiler pressure, or a series of varying pressures are used in different units. Such variations to the general principles, however, can be dealt with.

The use of the closed circuit accelerated system is not confined to new installations. It will often be found that the change-over is quite simple, as can be seen in Figure 3.

Editor's note: The above article and all the illustrations were supplied by Ryaland (M/CR) Ltd., Hulme, Manchester.

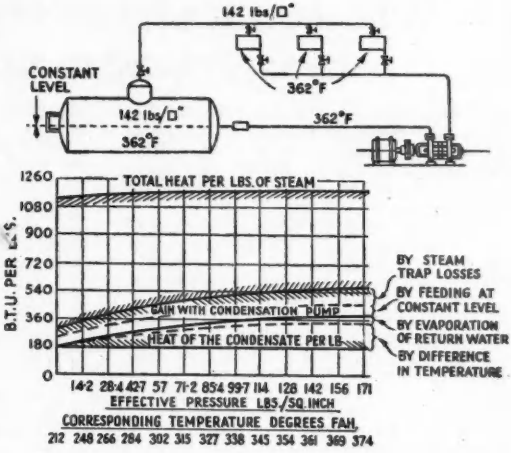


Fig. II: The vertical ordinates corresponding with the different pressures of the hatched surface represents B.T.U. per lb. of steam with same exchange as in Fig. I but with closed circuit

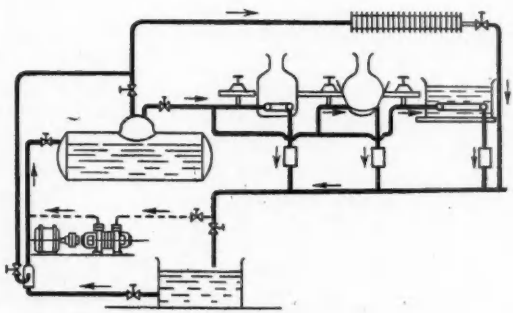


Fig. III: The above sketch shows a general installation comprising hot water tanks, evaporating and heating cisterns. The steam is distributed in tubes, steam jacketed tanks, or heat exchanger. The steam traps and conduits lead the condensation water to the tank, from which it is pumped to the boiler. By the installation of a special condensate pump economies of combustible of approximately 15-40 per cent can be attained and a saving of time in the manufacture is realised by the forced circulation. The conversion of existing installations present no difficulties. It suffices as shown in the above sketch to place a special condensation pump in the return line without changing the previous installation

AMERICAN CHEMICAL NOTEBOOK

* *

A NEW cloud chamber designed to permit observation continuously instead of intermittently for fractions of a second as previously, is now being used at the Brookhaven National Laboratory, Upton, New York.

In the new chamber, vapour is continuously diffused from a warm upper surface through air or another gas to a cold lower surface. At one stage between the two surfaces the vapour becomes sufficiently cool to produce supersaturation.

The device, which is simple to make and operate, was described at a recent meeting of the American Physical Society in Chicago by four Brookhaven scientists, Drs. E. C. Fowler, D. H. Miller, R. P. Shutt and A. M. Thorndike. It is particularly useful in studying interactions caused by beams of particles from cylotrons and other high energy machines.

* * *

A NEW $10 million potash refinery and mining shaft will be erected in the Carsbad, New Mexico, area by the Southwest Potash Corporation, a subsidiary of the American Metal Company, Ltd., New York. The new plant will be in operation by the end of 1951 and will increase the area's potash output by 185,000 tons annually. Southwest Potash is the fifth company to undertake operations in the area.

* * *

SHORTAGES of phenol are expected to be considerably alleviated when the new plant of the Bakelite Division of the Union Carbide and Carbon Corporation comes into operation at Marietta, Ohio, in the middle of next year. Whether the annual rated capacity of 60 million lb. can be attained will, however, be dependent on the supplies of benzene available.

* * *

FIBRE V, the British-developed textile fibre known in Great Britain as Terylene, is to be produced in the U.S.A. by E. I. du Pont de Nemours & Co., Inc. The first commercial plant is to be constructed on a 635-acre site at Kinston, South Carolina, originally purchased for a nylon plant. Du Pont officials stated that the new use of the site had been decided upon as extensive market studies indicated that Fibre V should be commercially produced as soon as possible. Design of the plant is under way and building is expected to begin sometime next year. Quantities of both continuous filament yarn and staple required for development work of Fibre V are at present being made in an experimental operation at the Seaford plant.

SYNTHETIC glycerin production is to be increased by the Shell Chemical Company, which initiated the manufacture of the substitute at its plant in Houston, Texas, two years ago. When additional facilities come into operation before the end of next year, output of synthetic glycerin rated at some 35 million lb. annually, is expected to be raised to 50 million lb. One of the reasons cited by Shell officials for the increasing shortage of glycerin has been the reduced production of by-product glycerin from soap manufacture due to a greater use of synthetic detergents. Furthermore, a general decline in glycerin supplies has resulted from increased use of the chemical to meet both civilian and defence requirements.

* * *

A URANIUM ore refinery costing $10 million is to be erected by the United States Government. A contract for design and engineering of the new refinery, which will be erected at an undisclosed location, has been awarded by the U.S. Atomic Energy Commission to the Catalytic Construction Company of Philadelphia, which is a subsidiary of the Houdry Process Corporation. Work under the contract will be accomplished in two phases: (1) a study of existing research and development work on uranium refining processes and the development of a preliminary engineering report; and (2) final selection of a process and detailed design and engineering of the refinery.

Aluminium from Canada

A NEW long-term pact with the Aluminium Company of Canada, Ltd., was announced by the Ministry of Supply on 18 December following the statement by the Parliamentary Secretary on 16 December.

Arrangements have been made for the supply of 50,000 metric tons of aluminium in addition to the 150,000 metric tons already contracted for in 1951. A further 220,000 metric tons will also be supplied each year, in 1952 and 1953.

The British Government have agreed to fund afresh over 20 years the loans made to the company during the war to finance the expansion in Canada, and to make a new loan to the company of $25 million towards the financing of further expansion. The company will give the U.K. a first call on 200,000 metric tons a year of its production for 20 years.

IMPORTANCE OF METAL PRE-TREATMENT

SATISFACTORY progress of a British method of metal pre-treatment in a period of only five years was demonstrated to members of the Trade Press at a conference held in London on 15 December.

The occasion was part of the annual sales conference of Jenolite, Ltd., and besides the chairman's report, practical examples were able to be examined of the Jenolizing process.

Introducing the managing director, Mr. R. C. Liebman, P.R.O., said that £150 million was spent every year in this country alone on fighting rust and corrosion. Jenolite was playing its part in helping to reduce this enormous expenditure. He went on to appeal to his audience not to regard the P.R.O. as "a cumbersome barrier" and not to be too impatient. There were sometimes difficulties in dissemination of news for security or other reasons.

Technical Information Offered

Complaints had been made that some handouts were not sufficiently technical—to that he could only reply—ask, and you shall be given. Jenolite chemists, research staff and technical experts were only too willing to help and members of the Trade Press were welcome any time to watch for themselves various processes or to visit laboratories.

It should be borne in mind that the P.R.O.s lot was not so simple when dealing with the National dailies. Mr. Liebman quoted the instance of a woman's page editress who queried whether the claims made for rust removed by Jenolite were justified. After giving her every assurance she was sent a sample bottle for trial.

After a few days the editress again rang him up to say she was "most disappointed," she had been rinsing her handkerchiefs for three days and they were still rust-spotted.

Mr. J. H. Lawrence, managing director, then made his report, and welcomed the opportunity for his representatives and the Press to become better acquainted. Every representative, he said, had to have a knowledge of engineering and all metal pre-treatment processes before he went out on the road.

Each man was recalled at regular intervals to be sent to the research laboratories for a refresher course during which he was made thoroughly familiar with any new products and processes.

In the five years since its inception Jenolising, competing with long-established methods, had successfully broken in to the metal pre-treatment field.

The company had been pioneers in introducing to the small manufacturer a process which had formerly been beyond his means. It had helped to make manufacturers in almost every industry metal pre-treatment minded, and by giving British goods a better finish had enabled them to stand up against American competition.

The past 12 months had been some of the busiest since the end of the war.

Export trade had been extended to very nearly every part of the globe and one of the finest items of news about achievements abroad has occurred only two days ago, when a representative in the United States, Mr. C. R. Osborn, arrived by air from California. He brought with him the news that one of the largest American building construction schemes, the Metropolitan Housing Unit of San Francisco had specified the use of Jenolite for the treatment of all steel structures and fittings.

This was indeed good hearing for it showed that even in the U.S.A., where they thought they were leading the world in the field of metal pre-treatment, a British product, had American ideas beaten.

Process Gaining Popularity

In other parts of the world too, particularly in Denmark, the process was being increasingly applied. At home the War Office, which had already subjected it to many severe tests in official government laboratories, had established that it was equal to and more economical than galvanising or electro-zinc plating. To make Jenolite more easily available to Scottish users, Jenolite (Scotland) Ltd. had been established in Glasgow earlier in the year.

The range of products and services had been extended. An aluminium degreaser and cleaner had been added to the stock list, in reply to an insistent demand for a degreaser which would not attack the metal surface. Decarbonising solution and paint stripper were being increasingly used in the motor repair and other industries.

Another successful product was the Jenolite chemical sealer which dispensed with expensive primers such as red oxide and red lead, normally used. This could be supplied for brushing, spraying or dipping application.

AMERICAN CHEMICAL ENGINEERS

Discuss New Developments at Annual Meeting

From our New York Correspondent

IMPORTANT new developments of interest to processing and manufacturing industries highlighted the proceedings of the 43rd annual meeting of the American Institute of Chemical Engineers, which took place in Columbus, Ohio, 3 to 6 December. Thomas H. Chilton, technical director of the development engineering division of E. I. du Pont de Nemours & Co., Inc., was elected president for 1951.

Reporting on recent work of atomic energy scientists, W. K. Eister and W. G. Stockdale, of the Oak Ridge National Laboratory, Oak Ridge, Tennessee, told the chemical engineers that decontamination techniques have been perfected that successfully eliminate the possibility of atmosphere pollution by radioactive airborne wastes from atomic reactors. They said that two methods could be used to eliminate radioactive washes, filtration and absorption. Since the great majority of the radioactive wastes were normally present as a fine dust, filtration techniques had been developed which reduce radioactivity to the level normally present in the atmosphere. "For those few radioisotopes which are true gases," they said, "more complex absorption procedures are required."

The cost of both techniques was high, they said, and the present trend had been to reduce the volume of air that might become contaminated. "The radioactivity that is removed from the air," it was revealed. "must be permanently stored, as it will be years, in most cases, before the radioisotopes have decayed to their stable products. In some cases, however, where work with short-lived radioisotopes is carried out, storage for about one hundred days is all that would be required."

Continuous Cold Rubber Process

Mr. M. W. Larson of the B. F. Goodrich Chemical Company, Cleveland, Ohio, described a continuous cold rubber process. Cold rubber was until recently produced by a batch method involving a 16-hour mixing period, but Mr. Larson told how Goodrich chemical engineers successfully overcame the obstacles in their path to convert the Goodrich-operated U.S. Reconstruction Finance Corporation plant at Port Neches, Texas, from batch operation to a continuous process. The new system permits continuous feeding of ingredients and results in a steady stream of liquid rubber latex. The conversion increased the capacity of the plant by about 20 per cent, lowered production costs, improved product quality, and resulted in better process and plant control. According to Mr. Larson, over 65,000,000 pounds of cold rubber have been produced by this process.

A new process for the manufacture of toluene and benzene, was described by Dr. Lloyd Berg and co-workers of Montana State College, Bozeman, Montana. A catalyst consisting of alumina pellets treated with hydrogen fluoride, which "triggers" the wanted reactions, was used they said. The shortage of important materials for explosives and synthetic rubber manufacture might be alleviated by the new catalytic process which converts certain aromatic hydrocarbons that are abundant in some petroleum oils into either toluene or benzene, they added.

Producing High Octane Petrol

Complex compounds in gaseous form when passed over the alumina pellets at high temperature were stripped of the undesirable constituent. The resulting products were distilled, yielding the benze and toluene fractions. Eventual production in fluidising units was predicted. Equipment of this type, it was pointed out, is now in use in the United States for manufacturing large volumes of high octane gasoline.

The barrier to the use of ultrasonic energy in industrial processes has been overcome by a new technique developed by the Brush Development Company in building a pilot plant two kilowatt ultrasonic generator. According to John W. Butterworth, director of Hypersonics at the Brush Company, generators of unlimited power can be built as a result of the development of a ceramic material which gives off high frequency, high intensity sound waves when excited electrically.

Some of the unique effects of ultrasonic energy have been known for nearly 30 years but have been limited in their industrial applications by a lack of necessary power. One application of these effects is in the killing of bacteria in vaccines and other pharmaceutical products. This method promises to be superior to sterilisation processes using either heat or chemicals. For example,

penicillin would have its effectiveness reduced greatly if it were sterilised by heating. Since it is frequently injected into the human blood stream, it is very difficult to add a chemical which would kill the bacteria and still not be harmful to the human body. Another use of sonic energy is in preparing emulsions of liquids or liquids and solids in order to prevent settling or separation. An instance of this application is the irradiation of paint by ultrasonic energy. When this is done, the pigment, or colouring matter, in the paint no longer settles out from the oil vehicle.

Experimental Model

While the Brush generator is an experimental model for pilot plant operations, it demonstrates that units of almost unlimited size can be constructed. Mr. Butterworth reported that the chemical field offers excellent potentialities for ultrasonic applications.

A study of the drying of single drops under varying conditions was described by W. E. Ranz and W. R. Marshall, Jr., of the University of Wisconsin. With the aid of microscopes and a motion picture camera, they obtained information on how a dry particle is formed during the drying of a single drop which initially contained the particle in dissolved or dispersed form.

Counting and measuring drops, a truly Herculean task, was described by Marshall, C. R. Adler, and two associates, all of the University of Wisconsin. They reported how they eliminated the tedious visual examination of photographs of sprays for drop number and size, by designing and operating an electronic drop and size analyser. The device, containing 160 electronic tubes and many lights and switches, scans photographs of sprays with a light beam. Electric pulses produced are sorted into size classes and counted, giving the number of drops of each size. Doing a 12-man-hour job of photographic scanning in ten minutes, the machine promises to have wide use in spray-drying research.

No Customs Duty

EXEMPTION from Customs duty of imports of books, newspapers, periodicals for advance in the education, scientific and cultural fields was the object of the Unesco agreement signed last month, said the President of the Board of Trade in a written answer. Scientific instruments of a type not produced in the importing country were also included. Arrangements were being made for the text to be published as a White Paper.

AMERICAN CHEMICAL ENGINEERS

New Officers Elected

THE American Institute of Chemical Engineers held its 43rd annual meeting at Columbus, Ohio, from 3-6 December. The institute, which is the professional organisation for chemical engineers in the U.S.A., was founded in 1908 and now has a membership of well over 10,000.

Mr. Thomas H. Chilton, technical director of the development engineering division of E. I. Du Pont de Nemours & Co., was elected president for 1951. He has been with the company since 1925 when he began in process development and unit operations research for the chemical department.

Elected by Post

A new vice-president, Mr. William I. Burt, was elected through a mail ballot of members. A vice-president of the B. F. Goodrich Chemical Co., he has twice been a director of the A.I.Ch.E. for three-year terms and has been chairman of many committees in the chemical engineering profession.

Four new directors were chosen as follows:—Mr. Charles R. Nelson, manager of the process engineering department of the Shell Development Co.; Mr. Earl P. Stevenson, president of Arthur D. Little, Inc., and a consultant to the Atomic Energy Commission and the Department of Department of Defence and Chemical Corps.; Mr. R. C. Gunness, manager of research of the Standard Oil Co., who has done much original work in distillation and heat transfer; Mr. R. Paul Kite, manager of the development lepartment of The Dorr Co., who is noted for his work on sedimentation and studies of pollution abatement.

The Junior Award of the institute was presented to Professor F. M. Tiller, associate professor of chemical engineering at Vanderbilt University, Nashville, Tenn. The honour is given for outstanding contributions to the literature of chemical engineering.

The professor was chosen for his paper on "Efficiencies in Gas Absorption, Extraction, and Washing," published in the magazine Chemical Engineering Progress in 1949.

Work Well-known

Professor Tiller has published numerous technical articles in chemical engineering literature and is known for his work in infra-red radiation and gas absorption. His industrial experience included a term as chemist with Colgate-Palmolive Peet.

NEW FUNGICIDES FOR LEATHER

From A SPECIAL CORRESPONDENT

THE importance of the fungicidal treatment of leather is now fully recognised and experiences in Korea have shown that nothing degrades leather footwear and equipment as quickly as fungi. Full realisation of the value of fungicidal treatment is found in the recent decision of the American Government that in future all military leathers would be required to contain three-tenths of 1 per cent of para-nitrophenol. This chemical is, of course, only one of the many mould preventatives which have been used with considerable success to make leather and also many other materials unfavourable for the growth of fungi. To list all the fungicides which have been employed from time to time for the treatment of leather would take up too much space. It is proposed, therefore, to describe some of the most recently introduced and interesting of these chemicals and to discuss their advantages and disadvantages.

Para-nitrophenol or para-hydroxynitrobenzene is available commercially as a brown granular mass having a melting point of 112° C. In its pure form it is a yellow crystalline chemical having a melting point 113-4. Para-nitrophenol is very soluble in hot water and soluble in alcohol, ether and many other solvents. It is toxic and must not come in contact with the skin and its dust or vapour must not be breathed. One of the reasons why p-nitrophenol is recommended is that it is freely soluble in sulphonated oils and many oleaginous mixtures used in tanning; soluble in tanning solutions and can also be dissolved in solvents, such as cyclohexanone which is used in some formulations recommended for spraying finished leathers. The main disadvantage of p-nitrophenol is that it is soluble in water and therefore easy to leach out of the leather, either during processing or when made up into footwear or equipment.

Copper 8-quinolinolate

An interesting non-soluble fungicide is copper 8-quinolinolate which is a yellowish-green powder, practically odourless and insoluble in water and organic solvents. This chemical is very stable, non-hygroscopic and possesses strong fungistatic properties. It is relatively non-toxic to higher animals. To facilitate application of this copper compound the preservative is available in the form of a 10 per cent water dispersible paste concentrate and a 20 per cent oil dispersible paste concentrate. An interesting new development is the use of copper 8-quinolinolate in an aerosol preparation containing oils suitable for the prevention of embrittlement in leathers and protection against rot and decay due to mould growth.

Copper Naphthenate

Another copper compound of great value as a fungicide is copper naphthenate. This is a soft, greenish resin soluble in all the common solvents but insoluble in water. It has a slight staining effect on leather and tends to leave the surface somewhat sticky if applied as a surface coating. If incorporated in the fat-liquor in proportions of about 1 per cent it gives excellent protection to both upper leather and sole leather. Not only does the copper itself contribute valuable fungicidal properties, but the presence of the naphthenic radical is also important in this respect.

Para-chloro-meta-cresol and para-chloro-meta-xylenol are used as industrial preservatives against mould and mildew and as auxiliary germicides in the manufacture of antiseptic and disinfectant fluids. They are white transparent crystals having a sharp but not unpleasant smell and soluble in a number of common solvents. Tetrachlorohydroquinone is another organic chemical which has been proved useful in controlling the growth of moulds in leather. Unfortunately, it is not readily miscible with sulphonated oils, fish oils and oleaginous mixtures and cannot easily be employed in fat-liquoring or "chamoising." Tetrachlorohydroquinone dissolves in a number of common solvents, including cyclohexanone, and can be used in spray formulae containing this solvent.

Sodium pentachlorophenate is now widely employed as a fungicide and preservative. In its commercial form this chemical has a distinct chlorophenolic smell and it is toxic to man and the higher animals. The commercial form of sodium pentachlorophenate is a dark, greyish flaky substance having a crystallising point 174° C. It is relatively non-hygroscopic and unreactive chemically; soluble in various degrees in organic solvents but relatively insoluble in water. One disadvantage of this fungicide is that its solutions may be irritating to the skin and therefore care needs to be taken in handling leather goods treated with pentachlorophenate preparations. Ortho and

para-benzylphenol are other fungicides of interest to the leather industry.

Para-dichlorobenzene, a chemical used very extensively to control the clothes moth, has also been successfully employed to prevent mildewing of stored leather. It is necessary that a saturated atmosphere of para-vapour be maintained in a storage compartment by replenishing the chemical as it is dissipated. Tests carried out by Monsanto Chemical Company have shown that an enclosed space of about 100 cu. ft., relatively air tight, was completely protected for two years using 1 lb. of para-dichlorobenzene during the hot months and about 1 lb. for the entire winter season.

Another interesting development in fungicides is the use of phenyl-mercuric compounds. After drying, these chemicals are irreversibly fixed to the leather and concentrations up to 5 per cent are not irritating to the skin.

The main requirements of a satisfactory fungicide for leather can be summarised as follows:—

1. It must be an effective fungicide when present in proportions not exceeding 0.3-0.5 per cent.

2. It must have no harmful effect on the skin and be non-toxic when its vapour or fumes are breathed.

3. The fungicide should not leach out readily from the leather when it is exposed to the weather.

4. The fungicide must not be corrosive in its action on metals, *e.g.*, one of the main disadvantages of the pentachlorophenols in that they attack metals.

5. It should be free from any distinctive or unpleasant smell and have no staining effect on delicately coloured leathers.

6. It should be convenient to use, *i.e.*, readily soluble in tanning oils and those solvents normally handled in a leather works.

FOOD TECHNOLOGY

National College for London

A NATIONAL College of Food Technology is to be established in London about September of next year. This decision was made after negotiations between the Ministry of Education, the Ministry of Food, and representatives of various sections of the food industry.

A board of governors has recently been appointed by the Minister of Education on the nomination of the interests concerned with Mr. Frank Shires, of the Food Manufacturers' Federation, as chairman. Dr. John Hammond, F.R.S., of the School of Agriculture, Cambridge University, has been appointed vice-chairman.

The college will provide the different sections of the food industry with training at a high level. This will include the handling, preservation, and processing of meat, fish, and other foods, together with their various derivatives and by-products; it will also deal with those branches of science most closely concerned with changes which take place in food during preservation and processing.

As a good foundation of science coupled with industrial experience is required students will be drawn from industry at a comparatively late age of 23 or over. Attendance will be on a full-time basis.

The college will at first be housed within the premises of the Smithfield Technical College and some nearby premises which have been adapted. Plans, however, are being made to acquire new premises soon.

Poison Act to be Amended

STATUTORY Instruments giving effect to recommendations made to the Secretary of State by the Poisons Board are being prepared. Changes in the Poisons List and in the schedules to the Poisons Rules are proposed as follows:—

1. *Organic compounds of Mercury.*—Organic compounds of mercury containing a methyl (CH_3) group linked to the mercury atom will be excepted from the fifth schedule.

2. *Para tertiary amyl phenol.*—This substance will be added to the entry in column 2 of Group II of the third schedule relating to phenols.

3. *Procaine penicillin.*—Procaine, when in preparations to which the Penicillin Act, 1947, applies, will be exempted from the first schedule.

4. *Anti-histamine substances.*—To the definition of anti-histamine substances given in Part I of the Poisons List and in the first, third and fourth schedules there will be added chlorcyclizine and promethazine.

5. *Flaxedil.*—This substance under the name "gallamine," which has been approved by the British Pharmacopoeia Commission, will be added to Part I of the Poisons List and to the first and fourth schedules.

6. *Paradione.*—This substance, under a name to be approved by the British Pharmacopoeia Commission, will be added to Part I of the Poisons List and to the first and fourth schedules.

PHYSICAL METHODS OF FOOD ANALYSIS

The subject of the second meeting held recently in Birmingham of the Midlands Analytical Methods Discussion Group was "Physical Methods of General Food Analysis." It was introduced by Dr. H. E. Cox. Following is an exclusive summary of the opinions expressed during the meeting.

PHYSICAL, or physico-chemical, methods of analysis depend essentially on the use of instruments, since the methods are based primarily on the measurement of some physical quantity. The instrument is becoming more and more indispensable to the analytical chemist and, in particular, to the food analyst. Thus, the methods of absorptiometry, flame photometry, emission spectroscopy and spectrography, to mention only a few, are applied in most modern laboratories despite the high cost of equipment. The comparatively new science of chromatography, especially paper chromatography, has proved invaluable to the analyst.

There is no doubt that the value of physical methods must be assessed in relation to the particular problem under investigation. The errors obtained in a determination by means of instruments are sometimes considerable compared with chemical assay. Hence, it is necessary to maintain a sense of proportion—for routine control, where a large number of analyses are required within a short time, physical methods are generally superior, but, where accuracy is wanted, probably chemical methods of analysis are more desirable.

Speed of Great Value

The great value, then, of physical methods lies in their speed, particularly in routine control analysis. For example, a flame photometric method for the determination of the alkali metals in foodstuffs will give results of a high order of accuracy in a few minutes, compared with the one to two days required by normal macrochemical methods. Again, emission spectroscopical techniques, while not yielding accurate quantitative results, will give a complete qualitative analysis of the material and an approximate quantitative analysis; with this important preliminary knowledge, the analyst can decide which methods are the most suitable for the elements sought.

It must not be forgotten, however, in this era of instrumentation, that behind these rapid, 'push-button' methods of analyses there is always a standardisation which depends on a knowledge of real chemical analysis. The instrument must be used as a tool as is the balance, but it is important to understand the chemistry of the process going on within the instrument.

Colorimetry Most Common

Probably the most commonly used physical method in food analysis is colorimetry. Within recent years, many new organic reagents have been developed which give colours of high intensity with many metal ions. In fact, most metals have been determined by virtue of the colours they produce with certain organic reagents. At the present time, the well-known Hilger Photoelectric Absorptiometer ("Spekker") has superseded the older types of colorimeter (Nessler tube, Tintometer, Dubosq colorimeter, etc.) where the judgment and the colour vision of the analyst are the critical factors in the analysis. As these older methods are, in the main, comparison procedures, the advent of the photoelectric instrument has been a boon to the analyst from the point of view of both speed and accuracy. Further, the newer procedures eliminate eyestrain and contribute to the well-being of the analyst.

Even such an instrument as the "Spekker" can behave capriciously at times, and certain definite procedures have to be adhered to during an analysis. For example, the manner of placing the cells in the holder is of importance. It has occasionally been found that by the mere reversal of the cell in its holder a different drum reading is obtained. Again, cleanliness of the cells is essential, while variations in the lamp often cause trouble.

Some workers regard it as a decided danger to rely too much on previously determined calibration curves, and prefer to run standards along with the actual determination.

The precision of measuring colour intensity by the modern instruments is often greater than the precision of the chromogenicity of the reaction, and this must be taken into account when stating the accuracy of the results.

Although the cost of apparatus should be a secondary consideration, the necessarily high cost of the "Spekker" has meant that some of the smaller laboratories have had to make do with less expensive and less versatile instruments. A wide variety of cheaper instruments, costing in the neighbourhood of £20 is available commercially. Only one type of cell,

however, is used with these instruments which generally suffer from a lack of sensitivity. The filters supplied have too wide transmission bands. However, instruments of this type are quite useful.

A direct reading photoelectric absorptiometer, as versatile and accurate as the "Spekker" has been constructed in the laboratory for less than £40 (Boots Pure Drug Co. Ltd., Nottingham). It can be used with the Ilford range of narrow band pass filters, and standard cuvettes up to 4 cm. can be employed. It is direct reading in either Percentage Transmission or Optical Density, mains operated, and is very simple to use. The light supply is a motor car headlamp bulb of about 24 watts at 6 volts. This is supplied from the mains through a constant voltage transformer. Parallel or slightly converging light is obtained by means of a cheap lens of about 2 in. focal length, and this light is passed through a mask to obtain a beam of about ½ in. square, cross section. On the mask, is fixed a heat absorbing filter and a sprung shutter which remains closed when not being operated.

Mounted in Perspex Holder

The cuvettes containing the solution and blank are mounted in a perspex holder on a simple slide so that they can be interchanged easily and quickly.

The filters, which are situated between the cuvettes and the photocell, are mounted on a rotating disc which projects through the side of the case for turning. A positive positioning device consists of a small sprung ball-bearing, which catches into a depression cut into the disc near the outside edge. By this means, the filters are very easily and quickly interchanged, an added advantage being that they are never handled, it being merely necessary to turn the disc to the appropriate filter number.

The photocell is a 45 mm. diameter circular "Eel" cell the output of which is fed into a galvanometer through an Ayrton Shunt consisting of a 10,000 ohm helical potentiometer.

The whole instrument, not including constant voltage transformer or galvanometer, is contained in a box 8 in. × 9 in. × 9 in. The light source is separated from the rest by a partition, so that no light can reach the photocell unless the shutter is operated.

The galvanometer gives full scale deflection with about 2 μ amps input and has a scale graduated 0 to 100 which can be used directly as per cent transmission. Current models have an additional optical density scale.

In operation, the filter is selected and, with the *Blank* cuvette in position, the shutter is operated and the helipot adjusted to give a reading 100 per cent T (or Zero density) on the galvanometer. The cuvettes are interchanged and the shutter opened again when per cent T or D is read off directly.

It has been shown recently that certain metals in combination with the well-known compound B.A.L. (British Anti-Lewisite) can be estimated absorptiometrically. The colourless complexes may be determined on an ordinary "Spekker" using the shortest wavelength filter to measure the maximum absorption, that it, using U.V. wavelengths.

Balance Developments

The chemical balance is, of course, still one of the main tools of the analytical chemist, and there have been many striking developments in balance manufacture within recent years. Several laboratories have now installed completely automatic balances which more than pay for themselves in the matter of a year or two by means of time saved in weighing. The integrating type of fully automatic balance is as yet unknown in the country, but there is undoubtedly a case to be made out for its introduction.

Chromatographic methods are proving invaluable to the analystical chemist, and are of special importance to the food chemist. Some workers have questioned the methods for the selection of solvents for these techniques and feel there is too much empiricism involved. However, it has been shown in numerous publications that solvents are not always selected at random, and that, in many cases, the best solvent or solvents for a particular separation can be logically selected.

A Common Fallacy

It is a common fallacy that column chromatography is the adsorption type, while paper chromatography is the partition type. Certain types of column chromatography, however, are of the partition type; for example, the separation of amino acids on a silica gel column.

The preparation of samples prior to the estimation of trace metals, etc., in foodstuffs, generally involves an ashing process. The need for extreme care during this process must be emphasised, as losses of metal both by volatilisation and fusion to the dish are common. If ashing is carried out in the presence of phosphate, alkalisation is essential, since losses of chloride and sulphate may be incurred in the presence of acid phosphate.

THE NICKEL INDUSTRY IN 1950

Canadian Output Peace Time Record

"DESPITE the fact that nickel was in tight supply during the latter half of this year, the amount available for distribution and Governmental stockpiling in 1950 was the largest for any peace time year in the history of the Canadian nickel industry." This was stated by Dr. John F. Thompson, president of the International Nickel Company of Canada, in a review of the nickel industry, in Ontario, on 14 December.

"It is expected," continued Dr. Thompson, "that nickel output by the Canadian producers, International and Falconbridge Nickel Mines, Ltd., for the year 1950, will approximate 250 million lb. Currently, International Nickel's production is running at substantially the average level of the war years.

"In the latter part of June, prior to the Korean conflict, when it became apparent that the demand for nickel would exceed the available supply, a voluntary rationing programme was put into effect. Although nickel, like other metals, remains in tight supply, military requirements are being met in full and shipments are being made to Government stockpiles. The trade's civilian requirements continue, however, to take the major portion of the world's supply.

"In the United States on 2 December an order was issued by the National Production Authority limiting the non-military consumption of nickel in the first quarter of 1951 to 65 per cent of the average quarterly rate of consumption during the base period comprising the first six months of 1950. The order is stated to be designed to maintain equitable distribution, through normal channels, of that amount of primary nickel remaining after meeting the requirements of the national defence.

Maintained at Capacity

"International Nickel's production of nickel for the past six months has been maintained at maximum capacity. This has only been possible through a development and expansion programme, to provide greatly increased underground ore facilities to replace open pit ore, depleted during the war. The broad mining development and expansion programme has entailed expenditures in recent years of some $90 million, of which over $40 million have been spent since the end of the war. This programme will require further large capital expenditures during the next several years to permit maintenance of current capacity production of nickel as the end of supplies from the Frood-Stobie open pits approaches.

"Canada, the world's predominant producer of nickel since the early part of this century, continued to furnish the industrial world with the major portion of its requirements. This year's nickel output of the French New Caledonian deposits is reported to have been sufficient to meet the requirements of French industry. No information is available on Russia's 1950 production of nickel. In September it was reported that the United States Government was planning to reactivate its idle nickel facilities at Nicaro, Cuba, which were closed early in 1947. The production of this plant for the preceding year, 1946, was reported at approximately 25 million pounds.

Major Increases in Costs

"In the second quarter of the year major increases in costs for refined nickel required International Nickel to raise its United States base price of electrolytic nickel to 48 cents per lb., including the United States import duty Prices in other markets were adjusted correspondingly. The increase brought the price of nickel to a level about 40 per cent above the average price prevailing for all markets in the pre-war years.

"The steel industry of the world, as in past years, again accounted for the largest portion of the nickel consumed in 1950 and the demand by this industry was appreciably above that of last year. The proportion of nickel-containing grades to the total production of engineering alloy steels did not appreciably alter during the year, although in the latter months some reshuffling between individual grades was necessary.

"Nickel alloy steels, including those containing chromium and molybdenum, were employed in large tonnages during the year. These steels find applications in essential constituent parts, such as shafting, gears, structural tubing and heavy springs, for the aircraft, automotive, agricultural machinery, machine tool, mining, petroleum, railroad and other industries.

"The advantages in resistance to corrosion and abrasion of the low alloy high strength steels, containing up to 2 per cent nickel, for the construction of railroad freight cars—especially in coal and ore service—have become well recognised.

"In hydro-electric plants in Great

Britain, nickel-chromium steel is being used for rollers, axles and other components of reservoir control gates. The machine tool industries of the United Kingdom, Germany and Switzerland are requiring larger amounts of nickel alloy steels to meet the exacting demands for high strength, toughness and general reliability in the world-wide demand for up-to-date equipment.

" The rapid strides that have been made in low temperature processing and the growing interest in bulk storage of liquefied gases resulted in an increased use of the straight nickel steels during the early part of the year. Low carbon 2.5 per cent nickel and low carbon 3.5 per cent nickel steels are now standard grades for temperatures of minus 20°F. to minus 150°F., and low carbon 9 per cent nickel steel is being used for temperatures as low as that of liquid nitrogen.

" British agriculture, with a higher percentage of its farmed acreage mechanised than that of any other country, is creating an increasing demand for nickel alloy steels for shafts, gears and other highly stressed components of tractors and of other mechanical equipment. The tractor industry in the United States is also expanding its consumption of nickel alloy steels.

" The use of nickel in alloy steel electrodes for metal arc welding has increased rapidly since the introduction of the lime-ferritic type of electrode coatings. These nickel steel electrodes are used widely in welding of railroad equipment, trucks, crushers, and both cast and wrought parts for heavy machinery. They are also standard for welding steels intended for low temperature service.

Stainless Steels

" During the first nine months of 1950 the production of stainless steels in the United States was the largest of any similar period in the history of the steel industry. The average quarterly production was in excess of 195,000 tons. Indications are that the output for the full year may approach 750,000 tons. Over 60 per cent of this production is expected to be nickel-containing grades, which will account for a large portion of the steel industry's nickel consumption.

" The chemical and petroleum industries remained the largest outlet for stainless steels in Western Europe. New oil refineries in Great Britain have taken large tonnages. In India, the world's largest sulphate of ammonia plant, now under construction, has required substantial quantities of stainless steels.

" In Western Europe production facilities have been taxed to the limit and striking evidence of sustained interest in steels of the 18-8 chromium-nickel type has been given by displays at leading industrial fairs. Chemical equipment of stainless steel was the predominant feature of the first post-war chemical plant exhibition in Germany.

" The extra low carbon grades of stainless steels continued to receive attention. These steels were used for welded and other equipment for which stress relieving treatments are required.

Mill and Foundry Products

" General advances in all fields of industry during the past year have been reflected in the expanding uses of malleable nickel and the " Inco " nickel alloys such as Monel and Inconel. This expansion had been noted in normal peace-time industry prior to the beginning of defence programmes.

" The chemical, processing and allied industries, as well as the so-called power and mechanical fields, as in the past, were among the larger users of these materials. Introduction by these industries of new and improved products was responsible for extension of existing applications of the " Inco " nickel alloys as well as for their introduction into new equipment, requiring high strength, resistance to corrosion, heat, wear, and combinations of these properties.

" Results of field performance and laboratory tests have confirmed the value of Inconel for such high temperature applications of those involved in the processing of natural gas.

" Further attention was directed to market potentialities for Inconel in other areas of high temperature service including the important furnace and heat treating fields. A hot-rolled Inconel ' T ' section was introduced by the Huntington (West Virginia) works of International Nickel in this connection. The primary purpose of this product is to provide manufacturers of furnaces and other high temperature equipment with ready-made and uniform structural parts at considerable economy over the cost of fabricating those parts in their own shops. This section can be welded, riveted, or otherwise joined without difficulty.

" Monel was widely used for all purposes involving resistance to corrosion, wear, and to temperatures under the higher Inconel ranges. Applications ranged from motor boat shafting to laundry and chemical equipment.

" During the year, nickel, Monel, and Inconel were made available in the form of expanded metal, used largely for screens where the finer meshes are not required,

though potential applications are not limited to such purposes. Uses have been broadened to include such diversified items as laundry and chemical plant equipment, and for lathing used to anchor insulation materials in steam and other power plants.

"The unique combination of properties of 'Ni-Resist'—resistance to heat, corrosion, wear and erosion, and thermal expansion control—has become increasingly recognised in the past year in sea water and insecticide pumps and valves, engine valve guides, steam service, engine liners and glass moulds, and for piston ring lands in aluminium pistons. Wherever heavy duty machines demand this unique combination of properties, 'Ni-Resist,' a cast iron containing nickel, is being adopted as standard. The commercial production of magnesium-containing Ductile Ni-Resist was successfully begun during the year. The improved strength and toughness of this new material, with its resistance to service deterioration, provides an economical alloy which is being favourably regarded by industry. Another new type of 'Ni-Resist,' which can be hardened after machining, is being service tested by many industries where resistance to corrosion and abrasion is required.

"Substantial quantities of 'Ni-Hard,' a white iron containing 2.5 to 4.75 per cent nickel, as well as chromium, were consumed in the form of steel mill rolls and as abrasion-resisting castings for the iron, copper and nickel mining industries and the power and ceramic fields. Grinding balls and slugs, cast in this nickel alloyed iron, found an expanding market in the cement and paint industries during the year, with reduction in the consumption rate of grinding media and reduced discoloration of the final products being important considerations.

Uses in Europe

"Engineering grades of alloy cast iron containing from 1 to 3 per cent nickel are increasingly being specified, notably in the Continental countries. Belgian foundries are supplying these irons for heavy lathe beds, large size lock-gate rollers, power station plant equipment and melting pots. Numerous parts of this material have been furnished by French foundries for hydro-electric plants in North Africa, Madagascar and other French colonies. Swedish interests are actively engaged in developing high duty nickel cast irons for automobile engine cylinder blocks and for small power units of all types.

"Ductile Iron, a product of International Nickel's research laboratories introduced early in 1949, has made good progress this year, emerging from the pilot plant stage to become an accepted engineering material. It is estimated that the output from licensed foundries for the year 1950 will be between 15,000 and 20,000 melt tons compared with 3,500 tons during 1949.

Nickel-Plating

"Nickel-plating continued its growth as one of the major nickel consuming industries. The demand for plating nickel during the first part of 1950 indicated that such use was about one-third greater than any former peak.

"While increased demand was apparent in the large field of protective coatings as represented principally by the automative industry, other newer and smaller uses showed greater relative increases.

"Utility uses of nickel-plating have increased. The use of disposable nickel-plated steel drums for the export shipment of caustic soda has been established as an economical procedure. The inside plating of steel tubing for oil wells and corrosive chemical use has gone forward in large size pilot plants and tubing is now being sold more rapidly than it can be produced. Electroforming of screens and other special shapes attained continuous production during the first half of the year. Immediate need for fabricated electroplated steel chemical engineering equipment has prompted the installation of facilities for the heavy plating of large pieces which can be utilised in the future for the extension of such business when present orders are completed.

Copper Base Alloys

"The greater output of castings, together with the undiminished use of nickel in gear bronzes, pressure castings and bearing bronzes, accounted for a larger consumption of nickel in the non-ferrous casting field during 1950. The alloyed bronzes containing 3 to 5 per cent nickel found applications for constructional and funcional purposes including valves, pumps, gears and machine frames. Nickel continued to be employed as an addition for equalising the distribution of lead in bearing bronzes and to improve their mechanical properties. More widely recognised has been the function of nickel in imparting high strength and hardness to the aluminium bronzes, as well as contributing to their corrosion-resistance. The high resistance to heat and wear of these alloys, has established their position in aircraft construction for such parts as valve guides, valve seats, rings and bushings. In Great Britain, ship's propellers up to 3¼ tons in weight are now being made regularly of a 5 per cent nickel-aluminium bronze, which is stronger and gives better

service than the manganese-bronze previously used.

"Nickel silver, a copper base alloy containing nickel and zinc, continued its progress for applications in which appearance, cleanliness, colour and finish and corrosion-resistance are essential requirements. This alloy is the preferred material for use as a base metal for the production of silver-plated ware and is used extensively.

"The cupro-nickel alloys are used mainly in industrial applications where corrosion-resistance and mechanical properties of a higher order than those obtainable in nickel silver are required. The enlarged activity in the building and reactivation of both naval and merchant vessels has increased the demand for these alloys where they are employed extensively for condenser tubing and salt water lines to withstand the corrosive effects of sea water. Cupro-nickel alloys also continued to be used in the petroleum industry, for heat exchangers in the refining of sugar, in power plants and water works service, as well as for valve trim in a great number of industrial applications. The iron-modified 10 per cent cupro-nickel alloy is finding increased application as an economical condenser tube and salt water piping alloy.

Iron-Nickel Alloy Specialities

"Utilisation of the iron-nickel base alloys with special magnetic and thermal expansion characteristics for control devices and radar, electronic and communications equipment continued on a steadily expanding scale during the year. Nickel is an essential constituent of these alloys in amounts varying from 22 to 80 per cent. Similarly, the markets for the extremely strong permanent magnet alloys of the Alnico type, containing 14 per cent or more of nickel, are increasing rapidly. New applications are constantly being developed, with the field of potential applications being very broad.

"Ferrites, ceramic-like magnetic materials used in various parts of television equipment, have caused a marked increase in the demand for nickel oxide."

New Canadian Chlorine Plant

THE first sizeable chlorine plant to use De Nora mercury-type cells, with a rated capacity of 30,000 ampères. is to be built by the Marathon Paper Mills in Canada. This is the result of an agreement recently reached between the Leonard Construction Co., of Chicago, the Monsanto Chemical Co., of St. Louis, and the Marathon Paper Co. The plant is to be erected at Marathon, Ontario, and will produce 25 tons of chlorine per day. Caustic soda suitable for rayon processing, electrolytic sodium sulphide, sodium hypochlorite and hydrochloric acid will also be manufactured at the plant.

French Studying U.S. Nitrogen

A TEAM of representatives of the French nitrogen fertiliser industry has just begun a six-week study of American methods of production.

Despite substantial gains in production in the five years since the end of World War II, French output of nitrogen is still far short of requirements. To step up French production, say the ECA authorities, will require the adoption of improved production techniques and lowered costs. The French team will discuss its problems with U.S. Government officials and will study plants operating in America.

Royal Technical College Dinner

THE PIONEERING efforts in technical education leading to the establishment of the Royal Technical College, Glasgow, were praised by Dr. Idris Jones, chief of the scientific department of the National Coal Board, when he spoke at the annual dinner-dance of the London branch of the R.T.C. Former Students' Association on 13 December.

Dr. Jones said that the college had evolved as an integration of the primary efforts in the field of technical education of a number of institutions, starting with John Anderson's work in 1796.

His institution was the first in which scientific instruction was given with special reference to its practical application—the first to provide systematic evening classes in science and the first institution open to women on the same terms as men.

In it was established the first laboratory in Britain for the teaching of chemistry. Later all institutions in Glasgow were amalgamated in what later became known as the Royal Technical College.

Dr. J. G. King, director of the Gas Research Board, in replying to the toast of "The College," mentioned that Dr. W. M. Cumming, formerly professor of technical chemistry at the college, had written to say that the Former Students' Association now had 200 members.

Sir Andrew Bryan, Chief Inspector of Mines and chairman of the London branch of the association, presided at the gathering, which numbered about 60. The London branch, formed about 18 months ago, now has 150 members.

PERACETIC ACID REACTIONS

From A SPECIAL CORRESPONDENT

PERACETIC ACID reacts vigorously and exothermically with unsaturated compounds to yield oxirane (α epoxy) substances and/or α glycols, dependent upon reaction conditions. A typical epoxidation procedure is the conversion of butyl oleate into epoxy butyl stearate. This is effected by adding the peracetic acid containing sodium acetate to the distilled butyl oleate with constant stirring and maintaining a temperature not exceeding 15-20°C. After stirring for four hours the stearate is separated by pouring the solution into concentrated brine. By utilising hydroxylation procedure it is possible by the use of peracetic acid to convert oleic acid into 9:10 dihydroxystearic acid. In this case the oleic acid is dissolved in formic acid containing a small quantity of sulphuric acid to act as a catalyst. The hydrogen peroxide is added very slowly and the temperature maintained at 40°C. for three hours. The hydroxy-formoxystearic acid is saponified with sodium hydroxide and after cooling the saponified product is poured into diluted hydrochloric acid, filtered, washed and cooled.

It is known that reactions of organic peracids with unsaturated compounds are general for compounds with isolated double bonds. Electron-attracting groups, such as carboxyl, keto, aldehyde, attached to or near a double bond slow down or prevent the reaction of a peracid with the double bond. By contrast, electron-releasing groups like the alkyl, attached to or in close proximity to a double bond, increase the spread of reaction. Among the unsaturated materials with which peracids have been reacted, the following may be noted; olefins (aliphatic and alicyclic), unsaturated fatty acids and esters, unsaturated alcohols, fats and oils, terpenes, unsaturated polymers (e.g. rubber), sterols and monomers, such as styrene.

The applications of epoxy and dihydroxy compounds are very numerous, e.g., in the manufacture of polyvinyl chloride and chlorinated rubber, epoxy compounds are acid acceptors and show valuable stabilizing action: dihydroxy fatty acids are trifunctional and can be used to create new modified alkyd resins (U.S. Pat. 1,815,886).

The use of epoxy compounds has also been suggested for the manufacture of new condensation polymers and as a cross linking agent for polymers containing active hydrogens. In U.S. Patent 2,451.173 a method is disclosed of making rubbery type polymers by polymerising dihydroxy fatty acids and epoxy fatty acids. Crowder & Elm (Ind. and Eng. Chem. 41,1771 (1949)) described methods of making synthetic dying oils by deacylating hydroxyacylated fatty acids and their esters. Swern & Jorden (J. Amer., Chem. Soc.) suggest the use of dihydroxy fatty acids and esters as synthetic waxes. Of growing interest is the development of soaps of dihydroxy fatty acids for specialised surface active uses.

Peracetic acid is produced by reacting glacial acetic acid with hydrogen peroxide in the presence of sulphuric acid (Greenspan F.B.J. Amer., Chem. Soc. 68,907 (1946). Alternatively, the peracid can be made by the interaction of acetic anhydride with hydrogen peroxide (Findley, T. W. Swern, D. S. Scanlan, J.T.R. Amer. Chem. Soc. 67,412 (1945), and Smit., Roc. Trav. Chem. 19,675-686-691 (1930)).

The Buffalo Electro-Chemical Co. Inc., U.S.A., who produce peracetic acid for the chemical industry state that epoxidation and hydroxylation reactions with this reagent and hydrogen peroxide are generally characterised by:—

High reaction efficiency (often quantitative yields)
Ease of reaction control
High reaction specificity
Ease of isolation of reaction products
Products of low residual unsaturation readily attainable
Minimum by-product formation
Use of only slightly higher than stoichiometric amounts of peracetic acid
Absence of metallic or other contamination
General solubility in the reaction medium
Applicability to aqueous and non-aqueous systems
Applicability to heterogeneous as well as homogeneous reactions
Recoverability of acetic acid for re-use.

Tinplate Exports

Shipment of tinplate to other countries is strictly controlled, stated Mr. Harold Wilson, President of the Board of Trade, in a reply to questions from Mr. G. R. Howard. No exports had been made to Japan during April to September, and it would seem unlikely that any allocation for shipment to that country would be made until supplies were adequate for canners in the U.K.

The Chemist's Bookshelf

IDENTIFICATION OF MOLECULAR SPECTRA. R. W. Pearse and A. G. Gaydon. Second Edition. 1950, London: Chapman & Hall, Ltd. Pp. xi + 276. Plates 12. 50s.

The first edition of this valuable work of reference appeared in 1941, and was designed to present the more persistent bands of molecules, arranged in order of wavelength, and in addition, a series of tables of both the absorption and emission band spectra of the molecules, listed separately.

The new edition contains data up to 1947, and in some cases up to 1949, so that the tables and other useful information about individual molecular spectra now occupy about 250 pages in the present edition as compared with about 200 pages in the first edition. The number of plates has also been increased, so that about 60 spectra are now illustrated by excellent photographs.

As in the first edition, the absorption of organic substances have not, in general, been considered for inclusion, so that apart from a few of the more obvious spectra such as those of benzene and formaldehyde, the contents are principally concerned with inorganic substances. However, the book continues to be a necessity for the spectroscopic laboratory, and the production of this edition is, as in the case of the first, a matter for congratulation to both authors and publishers. The remarkably small increase in price over ten years, which is rather less than proportional to the increase in the number of pages, is worthy of comment in these days when we regard steep increases in book prices as almost inevitable.—C.L.W.

THE EFFECTS OF ATOMIC WEAPONS. Prepared for and in co-operation with the U.S. Department of Defence and the U.S. Atomic Energy Commission. Revised September 1950.

Only a few years ago, intra-atomic structure was an esoteric interest of chemists and physicists. To-day, with its frightening consequences, it is everybody's business. That is why it is impossible to consider this grim, factual book solely from the standpoint of the scientist. The facts are soberly presented but every page cries out aloud reminding the scientist of his social responsibilities as a citizen.

Representing "the most nearly quantitative approach to atomic bomb phenomenology which can be published at this time," the text starts from a discussion of nuclear fission. With the collaboration of a wide range of researchers, the editors have then presented a word-picture, generously extended with illustrations, of an atomic explosion and its technical consequences. These include the effect of the shock wave, physical damage, thermal radiation and initial and residual nuclear radiation. From these basic data and deductions, practical civil defence themes have been developed. Radiations and their measurement are clearly explained and decontamination with detergents discussed; since radioactivity of any contaminated body will decrease, the authors point out that, in a sense, time may be regarded as a universal decontaminating agent.

The aim of this book is to promote an intelligent understanding of the effects of the enormous energy release which results from an atomic explosion. The standing of the individual authors and that of its editor, Professor Glasstone, professor of physical chemistry, are sufficient to testify to its accuracy. But the very intellectual eminence of these men has led them into difficulties in writing for the lay public. What, for instance, is the enquirer after atomic truth to make of comments such as these. "For elements of low atomic weight and gamma rays of moderate energy, the photo-electric effect and pair production are negligible and then it is possible to write

$$I = I_o B(\epsilon_o, \mu_e x) e^{\mu c x}"$$

Even for civil defence administrators, architects and engineers—who are explicitly referred to as possibly interested readers—parts of this text are going to be tough going.

Chemists in general will find this the most informative account yet of atomic explosion phenomena—incomparably fuller than our Home Office Civil Defence Manual II with which it invites comparison. But technical interest can only be a part of one's feelings in turning over these macabre pages.—I.B.

OVERSEAS

New Source of Saponin

A rich source of saponin, the natural soap used for making certain fire extinguisher foams, has been discovered in the heartwood of a British Guiana tree. Announcing this in their latest annual report, the Forest Products Research Board says that as much as 8 to 10 per cent of soluble material has been found in the Mora excelsa tree, of which about half is saponin.

Belgian Chemicals for Russia

Belgium is to supply chemicals valued at 50 million francs to the U.S.S.R. within the framework of the new trade agreement which is valid until 1 May, 1951. In addition, Belgium will ship 64,000 tons rolled iron and steel goods, 6000 tons copper wire, 5000 tons crude lead, 4500 tons of copper and 650 tons of tin, as well as an unspecified quantity of industrial diamonds. In return, Belgium will receive, apart from wheat and coarse grain, 20,000 tons of ferro-mangan, 25,000 tons of manganese ore, 5000 tons of asbestos, 6000 tons of phosphates, 150,000 tons of potassium salts (40 per cent), timber and newsprint.

Nickel Deposits Found in Greenland

Deposits of nickel ore have recently been found in north-west Greenland. Further investigations are required to show whether they are of economic value.

Expansion of French Metal Group

The well-know French non-ferrous metals group Societe Miniere et Metallurgique de Penarroya, Paris, is to increase its share capital from 1,613.75 to 1,800 million francs. This is the result of the decision of an extraordinary general meeting. The transaction has been authorised in order to finance, among other things, the absorption of the Soc. Miniere Metallurgique et Chimique de l'Orb, of the Soc. Française des Mines de Zinc d'Ain-Nouba.

Advanced Type of Crucible

An advanced type of crucible, suitable for fusing metals and other substances at high temperatures, is being manufactured by an Australian company at Waratah, New South Wales. The crucible eliminates annealing, has very high refractory characteristics, and has self-glazing properties which prevent oxidation. Its high thermal conductivity causes a faster melting of metals than in the usual type of crucible.

D

Aluminium Works May Close

Unless supplies of aluminium increase the works of Alumase, Ltd., Northamptonshire, employing 200, may have to close by March, 1951. A recent statement by the managing director indicated that the firm was now using 200 tons of aluminium a month, but there was the possibility of its supply of aluminium being restricted to about half that figure in the new year.

Nylon Plant for Denmark

Official permission for the import of the machinery required to equip a factory for the manufacture of nylon has been obtained by a Danish firm, Edwards & Rasmussen. Annual output of the proposed plant is scheduled at about 60 tons of yarn during the first few years, eventually reaching an annual output of 300 tons. This should prove sufficient to cover the requirements of the Scandinavian group of countries.

Nematocides Cure Soil Sickness

Liquid chemicals that turn into gas upon entering the soil are being used by American farmers to conquer the once mysterious "soil sickness." The underground gas attack kills millions of microscopic ellworms, called nematodes, which attack roots of plants. The chemicals, called nematocides, are derived from petroleum. They have proved remarkably effective against these pests, according to a report to the American Chemical Society by Dr. B. G. Chitwood, of the Catholic University of America.

New Coating Intermediate

A new baking-type coating intermediate that is expected to form a base for a whole new field of protective coatings has been developed in the U.S.A., by the chemical division of the General Electric Corporation. Called R-108 and said to combine outstanding chemical resistance with flexibility and heat resistance, this intermediate has been described as a new concept in coating materials. Based on selected phenol derivatives developed in the General Electric laboratories, R-108 is compatible with a variety of coating resins. Among qualities claimed for it are resistance to alkalis, acids, oxidising agents, solvents, salts and other corrosive chemicals over a wide temperature range; extreme toughness, flexibility and resistance to abrasion, and unusual stability to ageing at high temperatures.

HOME

Tin Prices Record

After a setback on 7 December when tin prices were quoted on the London Metal Exchange at £1080-1090 per ton for cash (a decrease of £52 10s). the market rallied on 8 December. Prices hardened, until, on 19 December, tin reached the record figure of £1302 10s. per ton.

Railway Research Organisation

The various research divisions of the railway regions are to be combined into one department, which will operate from 1 January under the direction of Mr. T. M. Herbert, formerly research manager to the LMS Railway. Chemistry research will continue at laboratories in all the regions, but the engineering, metallurgy, protective coatings, physics and textile divisions will all be located at Derby. Operational research headquarters will be in London.

Choral Society Aids Charities

Monsanto Choral Society recently gave a performance of the "Messiah" at the George Edwards Hall, Cefn Mawr. The event was organised by the local branches of the British Legion and the R.A.F.A. on behalf of the memorial committee.

Tar Works Fire

Fire broke out at the premises of Lancashire Tar Distillers, Ltd., in Hawthorne Road, Bootle, early on the morning of 12 December. The Bootle Fire Brigade was summoned at 7 a.m. A huge smoke pall covered the district. The various tar stills and other equipment at the works are situated in the open and when the brigade arrived at the main gate of the yard they were met by a sea of blazing tar which was creeping towards them. The tyres of a motor vehicle parked in the works roadway were ignited by burning tar and destroyed. First indication of the outbreak came when an explosion occurred inside one still containing 20 tons of tar. It was later ascertained that the base of the still had collapsed and the tar pouring through the gap was ignited by the furnace. The explosion scattered blazing tar over a wide area. The firemen, using four high-powered spray jets, soon began to bring the fire under control but just as they were getting the upper hand a second explosion in the still reignited the tar. The second outbreak was, however, quickly extinguished.

Tar Distillation Merger

An agreement has been signed by which the Litherland tar works of Brotherton & Co., Ltd., becomes part of the co-operative scheme of Lancashire Tar Distillers, Ltd., of Manchester. The new arrangement concerns only the tar distillation business of Brotherton & Co., Ltd., based on the Litherland works and will in no way affect their chemical and dyestuffs interests. The present merger is an important step in the integration of the tar distilling interests in the area under the North West Gas Board.

Laboratory Explosion

Fire which broke out around a cylinder of hydrogen, following an explosion in a physics laboratory at Manchester University was quickly extinguished. Damage was confined to a small area.

Shale Firm's Provident Plan

A provident scheme for employees is to be introduced by Scottish Oils, Ltd., beginning 1 January, 1951. The scheme, which is non-contributory on the part of employees, will ensure that a sum equal to 10 per cent of the annual earnings of each employee will be credited to him in the form of a lump sum on retirement. The scheme is based on a scale rising from 5 per cent credit in the first year of membership by yearly increases of ½ per cent to a maximum of 10 per cent in the eleventh year of membership. Thereafter, 10 per cent will be credited as long as membership lasts. About 5000 workers are concerned in the new scheme.

KID Exemptions

The following chemicals have been exempted from Key Industry Duty for the period 18 December to 31 December, 1950: Dibutyl phthalate, diethyl phthalate, dimethy phthalate, dioctyl phthalate, 2-methylnaphthalene, 2-naphthyl benzoate, paraformaldehyde.

Non-Ferrous Metal Supplies

The view that widespread redundancy of labour and a serious decline in production in all metal industries may result from a shortage of non-ferrous metals was expressed by the British Non-Ferrous Metals Federation in a statement issued in Birmingham on 11 December. Criticising the system of bulk purchases the Federation stated that the Minister of Supply, in carrying out that policy, had not at any time called for the advice of metal consumers.

· PERSONAL ·

THE retirement of LORD MCGOWAN, K.B.E., D.C.L., LL.D., from active office as chairman of the board of Imperial Chemicals Industries, Ltd., at the end of this year, was announced on 14 December.

Lord McGowan, who is retiring for reasons of health, will be succeeded by Mr. John Rogers, a deputy chairman of the company, on 1 January, 1951.

Lord McGowan

Lord McGowan has been actively associated with the company and its predecessors in title for more than 60 years. He was chairman of Nobel Industries, one of the four companies which merged to form I.C.I., Ltd., in December 1926, and was first president and deputy chairman of I.C.I. on its incorporation, succeeding Lord Melchett on the latter's death in December 1930.

Of Lord McGowan it has been written that he was "probably the highest explosive that ever emerged from Nobel's factory," and it is beyond dispute that his energy and concentration of purpose and his patriotism have played an important part in the welding of the British chemical industry into the powerful and progressive mechanism that it is today.

John Rogers

Mr. John Rogers has been actively associated with I.C.I., Ltd., and its predecessors in title since 1899. At the time of the merger in 1926 Mr. Rogers was a director of Nobel Industries, Ltd., one of the four constituent companies of I.C.I. He was elected to the board of I.C.I. at its first meeting and was appointed a deputy chairman in 1940. Mr. Rogers is a director of African Explosives and Chemical Industries and Cape Explosives Works.

Long-service awards to employees were presented by Robey & Co., Ltd., on Friday, 8 December, in the canteen of its works at Lincoln.

This was the third annual celebration of this nature. On the first occasion in 1948 the scheme only embraced employees with over 35 years' service, but last year it was extended to include all workmen with 10 years' service and over. This considerable increase in scope resulted in 320 men being qualified this year with a total of over 7000 years' service between them.

Under the revised scheme, Savings Certificates are given to each employee on reaching 10 years' service. Each subsequent year a further gift is credited and presented every fifth year. In addition, an illuminated certificate is also presented at the end of 35 years' service, and a further certificate every five years thereafter.

A message was read from the chairman and joint managing director, Mr. W. T. Bell, who was prevented from attending by indisposition.

Seven employees with over 50 years' service were formally presented to Mr. F. B. Perry, who apart from Mr. W. T. Bell, has the longest service as a director. The seven, whose record totalled 371 years, were: A. Banyard (57 years); J. Couldron and I. Priestley (each 53 years); J. Candwell, F. Lamming, F. Moses and T. Pask (each 52 years).

Fifty-year diplomas were also presented by Mr. Perry to J. Bugg, W. Heathershaw and I. Watson.

The evening ended with a concert and a vote of thanks to the directors was proposed by Mr. D. S. Maplethorpe, chairman of the Board of Co-operation. Appreciation of the artists, Mrs. Newton and the canteen staff, and the organising committee was expressed by Mr. A. Johnstone, works manager.

Principal guest at the annual dinner of the Textile Institute's Lancashire section, to be held at the Midland Hotel, Manchester, on Friday, 12 January, 1951, will be MR. BARRY T. BENSON, first secretary and commercial attaché of the U.S. Embassy. Mr. Benson is to propose the toast "The Textile Institute," to which the Institute's president, MR. G. H. SPENCER, J.P., of Nottingham, will respond.

The Stock and Chemical Markets

HOLIDAY influences have been an additional factor restricting stock market business this week. Prices were inclined to ease, although British Funds strengthened a little. Movements were generally small. Industrial shares derived some benefit from the F.B.I. statement, although further news of metal and other shortages suggests that earnings of many companies may be affected early in the new year.

It is now generally agreed that where earnings have risen and a large part placed to reserve, there can be no objection under existing conditions to shareholders having moderately higher dividends. Indeed, the Government does not ask for rigorous limitation of dividends to last year's rates, but for moderation and restraint in payments. For many years shareholders in some leading industrial companies have had unchanged payments, but there is now a fairly general movement to pay more if profits have advanced. Turner & Newall provide a recent example with a total of 20 per cent, against the 15 per cent in 1949, although 2½ per cent of the increase is a special anniversary bonus.

Chemical and kindred shares held steady with Imperial Chemical at 42s. 6d., Monsanto 50s., Fisons 25s. 3d., and Laporte Chemicals 5s. units, 9s. 10½d. W. J. Bush were 83s. Albright & Wilson held steady at 30s. 9d., following the share bonus announcement. Burke Roberts were 33s., F. W. Berk 2s. 6d. shares, 12s. 6d. and Brotherton 10s. shares kept firm at 21s. 6d. Amber Chemical 2s. shares were 2s. 6d., Bowman Chemical 4s. shares kept at 5s. 9d. and British Chemicals & Biologicals 4 per cent preference were 17s. 3d.

Despite the dividend increase, Turner & Newall eased to 86s. 6d. United Molasses were good up to 47s. 6d., on the belief that the company's dollar earnings are increasing. Lever & Unilever, at 42s., held steady, and Tube Investments were at nearly £6⅜ on the news that the £5 million of new £1 preference shares are being offered to shareholders at par.

Dunlop Rubber reacted to 54s. 9d. British Oxygen at 88s. 6d. held firm, but General Refractories, at 24s., lost their recent small improvement. United Glass Bottle (77s. 6d.) again held their price, but there were fluctuations in Triplex Glass, which are now 26s. 6d. British Glues & Chemicals 4s. units, at 22s., yield only 3½ per cent, but there are hopes that the dividend for the current year may be raised to 30 per cent. Goodlass Wall (39s. 7½d.) is another share which is the subject of higher dividend talk. It is realised, however, that 1951 is likely to be a very difficult year for industry in many respects, because apart from shortages of materials, there is the prospect of the April Budget bringing still higher taxation.

Boots Drug, at 48s. 9d., have eased a little. Sangers were 24s., Beechams deferred, 13s. 3d. and Griffiths Hughes, 21s. Borax Consolidated at 55s. 6d. were again steady. British Aluminium firmed up to 39s. 3d., on the belief that shortages of aluminium will not be as bad as was once feared. International Nickel shares were higher on balance, partly because of the increase in the price of the metal. Glaxo Laboratories at 59s. 4½d. were active again. Textiles lost ground, although Courtaulds were more active, largely because of market talk of higher dividend possibilities.

Oils failed to keep best prices, although the higher Apex and Kern River dividends helped sentiment and aroused hopes that some of the bigger oil companies may perhaps pay more in 1951.

Market Reports

MANCHESTER.—Although showing signs of seasonal quietness, the demand for heavy chemicals has been fairly brisk during the past week. Textile and other consumers have been taking steady deliveries of caustic soda and other alkalies, as well as potash, ammonia and magnesium compounds and a wide range of other chemicals. Quotations generally are strong in undertone and a further stiffening has occurred in a few directions. Supplies of most tar products are being well absorbed.

GLASGOW.—There has been considerable activity in the Scottish heavy chemicals market and an increasing demand for all types of chemicals and raw materials. Scarcity of drums has made deliveries difficult. The shortage of supplies is having an adverse effect upon the export market.

Dearer Nickel

The price of refined nickel in the U.K. was raised to £406 a ton delivered works, with appropriate increases for other countries—announced by the Mond Nickel Company on 13 December. The previous price was £386 a ton. The International Nickel Company of Canada and the International Nickel Company, Inc., of the U.S.A., also announced an immediate increase in prices of refined nickel.

Technical Publications

APPLICATION of Monel in many industrial countries for fat-splitting tanks and equipment is described in "Wiggin Nickel Alloys" (No. 328) just issued. Monel has excellent resistance to corrosion by both the hot fats and sulphuric acid in the concentrations used in the Twitchell process. The use of Inconel irons for glass gathering and blowing irons is the subject of an illustrated article, which shows that the usual oxide formed through the contact of glass and steel is avoided by this method.

* * *

ROAD Tar Binders and tarred materials are the subject of an *aide-memoire* prepared by the British Road Tar Association in booklet form to make readily accessible a summary of the relevant British Standard specifications and other publications.

* * *

DANGERS of atomic warfare and the effects of atomic weapons are summarised by Dr. Hirschfelder, professor of chemistry at the University of Wisconsin. in the November issue of the "Atomic Scientists News."

* * *

INSTRUMENTS and equipment for the colour temperature control of butt welding are described in "Elcontrol News" (November, 1950, No. 2). Also given are details of photo-electric flame failure equipment for use with oil burners and apparatus for loop tension control.

* * *

A REVISED edition of standard steel lists of AISI and SAE is being offered to the trade by Babcock & Wilcox Tube Company. The four-page technical data card covers three groups: basic open-hearth and acid-bessemer carbon steels and resulphurised carbon steels, open hearth and electric-furnace alloy steels, and stainless and heat-resisting steels, subject to standard variations for check analysis. Percentage of chemical composition limits and other elements are stated for each steel. Known as technical data card 119C, the ready-reference list is available on request.

* * *

PROCEEDINGS of the third conference on chemical works safety held at Scarborough from 29 September to 1 October have now been published in full, with illustrations, and are now available from the Association of British Chemical Manufacturers' Association (5s. post paid). The number of delegates attending exceeded the two previous years.

COLORIMETRY of a more accurate nature is the object of apparatus designed to simplify absorptiometry, details of which are set out in its latest illustrated leaflets by Hilger & Watts, Ltd. The microptic colorimeter is an advanced instrument designed on the Duboscq principle. Its most outstanding feature is the incorporation of optically read glass scales to determine directly, without the use of tables or intricate calculation, the percentage concentration of a coloured solution by comparison with a standard solution of known concentration.

To Combat Sulphur Shortage

IN VIEW of the dire world sulphur shortage, Italy, the leading European sulphur producer and exporter, is planning to take steps to increase its sulphur output. While the scarcity of sulphur has already created serious bottlenecks in the chemical and other industries of the leading industrial countries of the world, it will undoubtedly bring about an improvement of the situation of the Italian sulphur mining industry which has been in difficulties for many years past through U.S. domination of the market and its own high-cost structure.

It is interesting to note that the new capital increase of the well-known Montecatini mining and chemical group from 30 to 40 milliard lire—which has just been authorised by an extraordinary general meeting—is largely to be used for increasing the productive capacity of the group's sulphur mines, to increase output of pyrites, sulphuric acid and chemical fertilisers. Other units of this widely-ramified group which are to benefit from this capital increase are the production of nitrogen, man-made fibres, plastic materials, and solvents.

The Board reports a market increase of sales since the war in Korea and most units are utilising their capacity to the full. With a few exceptions, production index figures have increased above pre-war.

Second Packaging Course

Because of the popularity of the first educational course for junior executives held in November, the Institute of Packaging has arranged a second course to be held at Shell-Mex House, Strand, London, W.C.2, from 12-16 March, inclusive. Completed applications should be sent to the Secretary before 12 February 1951.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

C. WILES, LTD., Beverley, fertiliser manufacturers. (M., 23/12/50). Nov. 21, deb., to Martins Bank, Ltd.; general charge.

SCRIVENS, LTD., Birmingham, manufacturing chemists. (M., 23/12/50). Nov. 16, mort., to Scottish Amicable Bldg. Soc. securing £3400 and any other money, etc.; charged on 167 Castle Square, Webley Castle, Birmingham. *Nil. Mar. 14, 1949.

BRADLEY & BLISS, LTD., Reading, manufacturing chemists and druggists. (M., 23/12/50). Nov. 14, charge, to Barclays Bank, Ltd.; charged on Victoria Works, 19 Princes Street and 12a Eldon Place, Reading. *£6000. Jan. 3, 1950.

CHARLES A. MAIR, LTD., London, S.W., chemists. (M., 23/12/50). Nov. 21, £1778 deb., to Mrs. A. Mair, London; general charge.

HOWE & GUNSON, Blackpool, disinfectant manufacturers. (M., 23/12/50). Nov. 17, deb., to Barclays Bank, Ltd.; general charge. *Nil. May 20, 1950.

Satisfaction

J. J. WHARMBY & SONS, LTD., Mansfield, chemists. (M.S., 23/12/50). Satisfaction Nov. 16, of mort. reg. Aug. 18, 1949.

Company News

Albright & Wilson, Ltd.

The directors of Albright & Wilson, Ltd. announce that the issue of one ordinary stock unit of 5s. for each 5s. stock unit at present held, agreed at the extraordinary general meeting of the company held on Tuesday, 19 September, 1950, can now be effected following the approval of the High Court to the variation of the rights of the 6 per cent original preference shares. Stock certificates will be posted on 15 January, 1951, to stockholders on the register at the close of business on 29 December, 1950. The new stock will rank equally with the existing Ordinary stock for the final dividend payable in respect of the company's year ending 31 December, 1950.

Increase of Capital

The capital of CYCLO CHEMICALS, LTD., Manfield House, 376 Strand, W.C.2, has been increased from £3000 to £10,000.

New Registrations

Vermico, Ltd.

Private company. (28,038). Capital £1000. Objects: To carry on the business of exfoliating vermiculite by heat processing, and that of brokers of and dealers in hydrous silicates, etc. Subscribers: R. M. Chubb and A. Hadden, manufacturers, both of 540 Tollcross Road, Glasgow.

Henry Corbett, Ltd.

Private company. (489,425). Capital £20,000. Objects: To acquire the business of a drysalter and oil and colour merchant carried on by Henry Corbett at 60-66 Newtown Row, 7-9 Ashted Row, Brearley Street and Rower Street, all in Birmingham. Directors are: H. Corbett, E. J. Taylor, N. H. Cornwall. Reg. office: 60-66 Newtown Row, Birmingham.

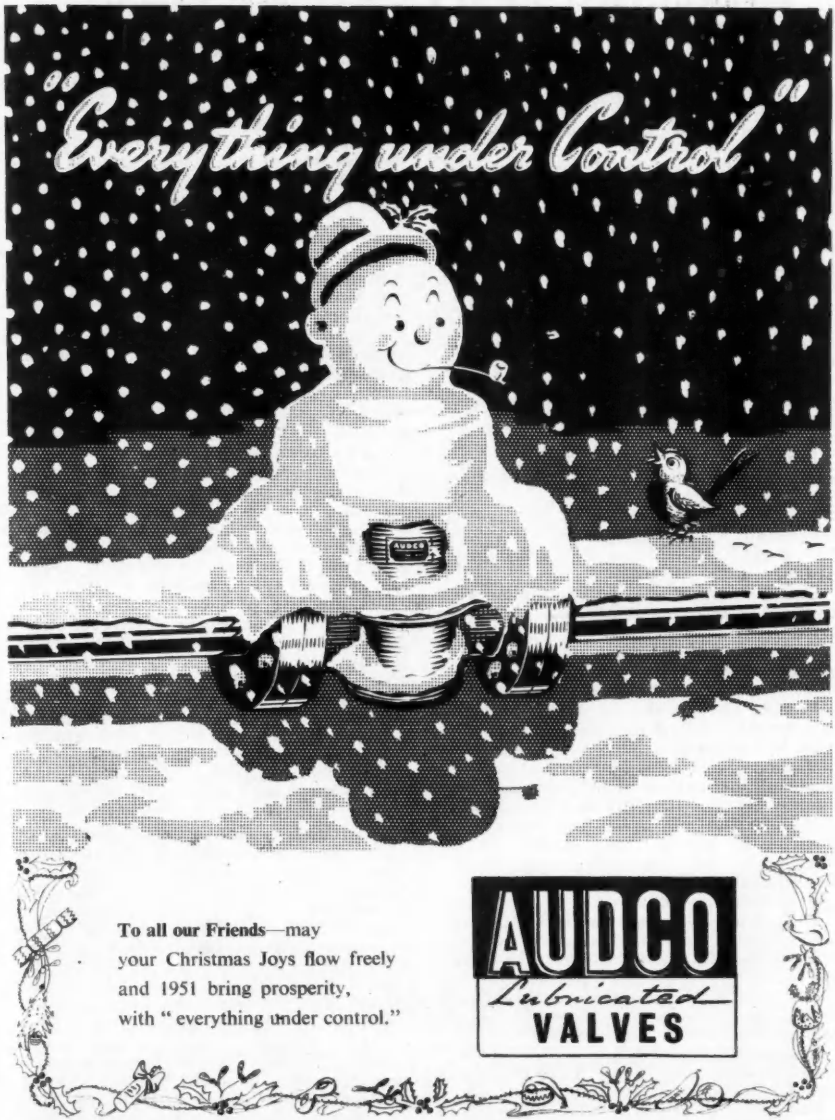
Coleyshaw, Ltd.

Private company. (489,413). Private company. Capital £25,000. Manufacturers of colours, pigments, dyes, varnishes, chemicals, synthetic resins, plastics, etc. Directors: H. B. Coleyshaw, and C. M. Beavis. Reg. office: The Laurels, Joinings Bank, Langley Green, near Birmingham.

U.S. Synthetic Rubber Plans

Production of synthetic rubber at the Government-owned plant at Akron was announced by the Goodyear Tyre and Rubber Company to begin on 18 December. The factory, which has been in process of modernisation since September, is expected to have a daily output capacity of 150,000 lb.

MR. EDWARD FAIRHURST left for Australia on 15 December to become manager of the new rayon fabrics works of Bradford Dyers' Association, Ltd., at Sale, near Melbourne, Australia. Before taking up his new appointment Mr. Fairhurst was manager of the Brighouse works of Thornton, Hannam & Marshall, Ltd.



To all our Friends—may
your Christmas Joys flow freely
and 1951 bring prosperity,
with "everything under control."

AUDCO
Lubricated
VALVES

AUDLEY ENGINEERING CO. LTD., NEWPORT, SHROPSHIRE. 'Phone Newport, Shropshire 3245

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Manufacture of esters of aromatic dicarboxylic acids.—R. Page and W. Hunter. Feb. 14 1949. 646,968.

Process of preparing polymerisation products in granular form.—Monsanto Chemical Co. Feb. 17 1948. 646,969.

High-voltage selenium rectifiers and manufacturing process.—Standard Telephones & Cables, Ltd. Feb. 20 1948. 646,852.

Process for preparing artificial oestrogenic compounds and products obtained thereby.—A. Horeau and J. Jacques. Feb. 26 1948. 646,828.

Resinous semi-conducting materials including conductive carbon.—Westinghouse Electric International Co. March 9 1948. 646,970.

Process for dyeing or printing superpolyamide fibres.—Ciba, Ltd. March 30 1948. 646,742.

Process for the production of oxygen-containing organic compounds.—N.V. De Bataafsche Petroleum Maatschappij. April 14 1948. 646,744.

Continuous precipitation of cellulose derivatives.—Hercules Powder Co. April 27 1948. 646,971.

Preparation of ephedrine and salts thereof.—Soc. Des Usines Chimiques Rhone-Poulenc. May 18 1948 646,750.

Process for preparation of heterocyclic compounds.—N.V. De Bataafsche Petroleum Maatschappij. May 19 1948. 646,829.

Method of and means for preventing and removing incrustation upon containers for liquids.—H. Loosli. May 22 1948. 646,882.

Manufacture of dyed leather.—J. R. Geigy A.G. May 28 1948. 646,753.

Apparatus for determining liquid densities.—Natal Tanning Extract Co., Ltd. June 2 1948. 646,831.

Method of and apparatus for high-speed high-pressure oxygen cutting of metals. —Linde Air Products Co. June 11 1948. 646,887.

Azo compounds containing a thiazolone cyanine dye component.—General Aniline & Film Corporation. June 14 1948. 646,888.

Process of preparing trinuclear, cyanine dyes.—General Aniline & Film Corporation. July 12 1948. 646,896.

Compositions for the protection of metals from corrosion.—N.V. De Bataafsche Petroleum Maatschappij. July 15 1948. 646,662.

Production of dimethylamine.—Robinson Bros., Ltd., and S. A. M. Thompson. July 7 1949. 646,976.

Soldering.—Mond Nickel Co., Ltd., E. C. Rhodes and D. W. Rhys. July 28 1949. 646,899.

Thiazolone cyanine dyes and the method of preparing the same.—General Aniline & Film Corporation. Aug. 6 1948. 646,900.

Treatment of cellulose esters and ethers with naphthopyridine derivatives to inhibit gas fading.—General Aniline & Film Corporation. Aug. 13 1948. 646,832.

Process for the production of 17 hydroxysteroids.—Syntex Soc. Anon. Aug. 16 1948. 646,979.

Manufacture of contrast agents comprising iodo-substituted esters. — Glaxo Laboratories, Ltd., and K. N. Speyer. June 14 1949. 646,764.

Detergent composition.—Scottish Oils, Ltd., and D. Stewart. Sept. 15 1949. 646,765.

Crystal contact devices and methods of manufacture thereof.—General Electric Co., Ltd., R. L. Breadner and R. W. Douglas. Oct. 25 1949. 646,674.

Manufacture of low pressure mercury vapour lamps comprising a vitreous envelope internally coated with a fluorescent powder. E. K. Cole, Ltd., and J. N. I. Evans. Oct. 5 1949. 646,676.

Apparatus for mixing the vapour of a volatile anaesthetic with air.—W. Edmondson and W. Jones. Oct. 27 1949. 646,680.

Textile printing process.—I.C.I., Ltd., and R. Thornton. Oct. 28 1949. 646,690.

Heat treatment of metals.—A. G. E. Robiette. Oct. 20 1949. 646,691.

Continuous manufacture of sheets of glass.—Soc. Anon. Des Manufactures Des Glaces et Produits Chemiques De St. Gobain, Chauny, & Cirey. Oct. 28 1948. 646,693.

Coloration of cellulose acetate.—T. E. Marchington & Co., Ltd., G. D. Sutton and O. Boothby. Oct. 29 1948. 646,769.

Process for the manufacture of accumulator plates sintered from metal powder. —Accumulatoren Fabriek Varta N.V. May 18 1948. 646,313.

Azo coupling components for diazotype photoprinting materials.—General Aniline & Film Corporation. May 24 1948. 646,543.

Selective hydrogenation processes.—E. I. Du Pont de Nemours & Co. June 30 1948. 646,408.

(continued on page 894

Something Missing!
YES. THE ROBBICAN · HAVE YOU SEEN IT?
• SQUARE TAPERS 2 & 5 GAL CAPACITY
• P.T.L. KEGS 6" to 14" DIAMETER
• ROBBICANS....?
F. ROBINSON & CO. LTD.
SOUTHCOATES LANE · HULL · TELEPHONE 31818-7

Patent Processes

(continued from page 892)

Dielectric compositions.—British Thomson-Houston Co., Ltd. Aug. 9 1948. 646,410.

Process for the manufacture of methyl and ethyl chlorides.—Dow Corning Corporation. Sept. 13 1948. 646,620.

Fluorescent luminous bodies.—Egyesult Izzolampa es Villamossagi Reszvenytarsasag. Sept 15 1948. 646,414.

Process for the manufacture of aldehydes from β-ionone-like ketones.—Roche Products, Ltd. Sept. 22 1948. 646,623.

Process for the treatment of nickel-containing ores.—International Nickel Co. of Canada, Ltd. Sept. 28 1948. 646,488.

Sintered hard metals.—Bohler & Co., A.G., Geb. Sept. 30 1948. 646,627.

Manufacture of paints and varnishes.—C.D. Patents, Ltd., M. Kaufman, and A. F. Williams. Oct. 6 1949. 646,325.

Production of organohalosilanes.—J. G. Fife. (Dow Corning Corporation). Oct. 28 1948. 646,629.

Magenta coloured phenazonium dyestuff photographic images by colour development.—General Aniline & Film Corporation. Dec. 14 1948. 646,348.

Colour developers for the production of phenazonium dyestuff photographic images.—General Aniline & Film Corporation. Dec. 14 1948. 646,490.

Graphitic alloy steels and nitrided products made therefrom.—Nitralloy Corporation. May 4 1945. 648,242.

Production of vitamin preparations.—S. E. Matthews (Severoceske Tukove Zavody, Drive Jiri Schicht, Narodni Podnik). Aug. 9 1946. 648,247.

Method for making a water solution of raw aluminates of lime and its application to the manufacture of alumina.—Soc. Des Ciments Francais. Aug. 27 1946. 648,248.

Polymers of N-disubstituted amides of the acrylic acid series.—General Aniline & Film Corporation. Oct 2 1946. 648,250.

Production of hydroxyalkylamides of acrylic acids and polymers therefrom.—General Aniline & Film Corporation. Oct. 2 1946. 648,251.

Production of hydroxyalkylamides of of poly alpha-substituted acrylamides.—General Aniline & Film Corporation. Oct. 2, 1946. 648,252.

Production of hydroxyalkylamides of the acrylic acid series.—General Aniline & Film Corporation. Oct. 2 1946. 648,253.

Alpha-substituted N-hydroxyalkylacrylamides.—General Aniline & Film Corporation. Oct. 2 1946. 648,254.

Graphitic alloy steel castings and the nitriding of such castings.—Nitralloy Corporation. Dec. 3 1946. 648,258.

Atomised copper-lead base alloys.—Federal-Mogul Corporation. March 28 1947. 648,379.

Ion generators.—Compagnie Generale de Telegraphie Sans Fil. May 30 1947. 648,261.

Method and apparatus for removing gaseous and readily vaporisable materials from liquids.—Girdler Corporation. June 3 1947. 648,310.

Oxidation of olefines.—Distillers Co., Ltd., E. P. Goodings and D. J. Hadley. June 16 1948. 648,386.

Concentration of vitamins. — M. W. Kellogg Co. July 31 1947. 648,268.

Process of producing magnesium oxide and products resulting therefrom.—Permanente Metals Corporation. Aug. 6 1947. 648,315.

Production of oriented polymers and copolymers.—Firestone Tire & Rubber Co. Aug. 7 1947. 648,392.

Process of synthesising hydrocarbons.—Standard Oil Co. Aug. 8 1947. 648,317.

Process of pouring metals and products produced thereby.—Vanadium Corporation of America. Aug. 26 1947. 648,321.

Fibrous filter media.—W. I. Taylor and J. W. Grebby. Sept. 21 1948. 648,395.

Coatings of vitreous compositions on aluminium, and aluminium alloy surfaces.—R. P. Fraser and A. L. Cianchi. Oct. 28 1948. 648,279.

Production of water-insoluble cation-active phenol formaldehyde condensation products.—American Cyanamid Co. Oct. 24 1947. 648,281.

Method of producing organo-phosphorous compounds.—California Research Corporation. Dec. 4 1947. 648,328.

Process for the production of complete fertilisers.—Norsk Hydro-Elektrisk Kvaelstofaktieselskab. Dec. 9 1947. 648,330.

Absorption refrigerating apparatus of the inert gas type.—Electrolux, Ltd. Dec. 17 1947. 648,288.

Manufacture of dyestuff preparations.—Ciba, Ltd. Dec. 19 1947. 648,332.

Refractory siliceous material. — P. Ciferri. Dec. 30 1947. 648,335.

Methods of and apparatus for utilisation of the thermal energy released in the course of atomic decompositions. — C. Chilowsky. Dec. 31 1947. 648,293.

Process for the manufacture of aluminium by means of melt electrolysis at relatively low temperatures.—Aktieselskabet Ardal Verk. Dec. 31 1947. 648,337.

Manufacture of the dichlorohydrins of 4-vinylcyclohexene. — Imperial Chemical Industries, Ltd. Jan. 19 1948. 648,456.

Preparation of bromine-containing chlorinated aldehydes and ketones. — United States Rubber Co. Jan 30 1948. 648,463.

Exports Still Higher

According to official Swiss trade returns for November, exports of the chemical and pharmaceutical industries (in million Swiss francs) have increased further to 57.1 as compared with 52.2 in October. Since November of last year, export values have increased by about 50 per cent. Dyestuff exports have maintained their leading position with 24.2 (22.1), followed by pharmaceutical goods 20.7 (18.8). Exports of industrial chemicals too have risen from 8.1 to 9.6.

ALTRINCHAM JUTE LTD.

Sacks and Bag Merchants and Manufacturers
Buyers and Sellers of used jute sacks for Home and Export for all purposes
25, VIADUCT ROAD, BROADHEATH, ALTRINCHAM, CHESHIRE. *Tel. : ALTRINCHAM 4360*

NATURAL LIQUID RUBBER LATEX

for all Industrial Uses

NORMAL	40%	Dry Rubber Content
CENTRIFUGED	60%	

Produce of British Malaya. Stock available from Local Bulk Storage in 45-gall., 5-gall. and 1-gall. containers.
Inquiries to: **DAVID MARSH (Manchester) LTD.**
Queen's Rd., Collyhurst, Manchester 9. *Tel:* COL. 1949

"LION BRAND"
METALS AND ALLOYS
MINERALS AND ORES
RUTILE, ILMENITE, ZIRCON,
MONAZITE, MANGANESE, Etc
BLACKWELL'S METALLURGICAL WORKS LTD.
GARSTON, LIVERPOOL, 19
ESTABLISHED 1869

Decolorising **CARBON**

ALL GRADES FOR ALL TRADES

HIGHEST EFFICIENCY
LOWEST PRICES

Granular Carbon for Solvent Recovery.
Regeneration of Spent Carbon.

Write for samples and quotations.
FARNELL CARBONS LIMITED
CONDUIT ROAD, PLUMSTEAD, LONDON, S.E.18
Telephone: Woolwich 1158 (2 lines). *Telegrams:* Scofar, Wool, London.

We specialize in the
RARER METALS
THEIR ORES, ALLOYS, OXIDES & SALTS,
AND THEIR LATEST APPLICATIONS
PLEASE SUBMIT YOUR ENQUIRIES & PROBLEMS TO —
NEW METALS & CHEMICALS LTD
16, NORTHUMBERLAND AVENUE, LONDON, W.C.2
Phone —Whitehall 0573 (5 lines). Grams —Newmet, Phone, London. Cables —Newmet, London
WAREHOUSE: CRAVEN HOUSE, CRAVEN STREET, W.C.2

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

DESIGN ENGINEERS, with B.Sc. Degree in Mechanical Engineering or equivalent, and not over 40 years of age, are required by The Bahrein Petroleum Company, Limited. Experience to have been in design of Oil Refineries, coal tar, chemical distillation or similar plants, involving electrical and steam systems, pressure vessels, fractionating columns, heat exchange and pumping equipment. Salaries according to qualifications and experience, plus kit allowance. Provident Fund. Free board and air-conditioned accommodation, medical attention. Low living costs. Two-year agreements with paid leaves and transportation. Write, giving full particulars of age, education and experience, to **Box 3785, c/o Charles Barker & Sons, Ltd., 31, Budge Row, London, E.C.4.**

OIL Refinery Contractors handling large contracts for Refinery Plant, require **CONTRACT ENGINEERS** in their London Office. Duties involve broad direction and co-ordination of all phases of the work, including planning, drafting, purchasing, progressing and erection. Desirable qualification is previous experience of Refining Industry or Heavy Engineering, including a wide knowledge of pumping, heat-exchange equipment and instrumentation, and the appointment offers excellent prospects to suitable men. Applicants should write fully, stating qualifications, age and experience, to **Foster Wheeler, Ltd., 3, Ixworth Place, London, S.W.3.**

TECHNICAL RECORDS OFFICER required by the Division of Atomic Energy (Production), to be responsible to the Technical Records Group Manager, for the operation of the technical records and statistical department of a large chemical factory at Springfields, Salwick, nr. Preston.

Candidates must have either an Honours Degree in Chemistry, Associateship of the Royal Institute of Chemistry, or equivalent qualifications. They must have an aptitude for compiling, correlating and interpreting plant operating data and, preferably have had some operational experience in a chemical factory. Salary will be assessed according to qualifications and experience within the ranges £570-£720 per annum (if over 30) and £330-£545 per annum according to age (if under 30). A Superannuation Scheme will be introduced in the near future. Applications to **Ministry of Supply, D.At.En. (P) Risley, nr. Warrington, Lancs.,** quoting Reference SC3/1. Rs.3310—20-JS-7.12.50.

WORKS CHEMISTS AND TECHNICAL ASSISTANTS are required by the Division of Atomic Energy (Production) at Windscale Works, Sellafield, Cumberland, and Springfields Factory, Salwick, nr. Preston. The work involves the control of novel and complex chemical processes, many of which are still under development. Candidates must have either an Honours Degree in Chemistry, Metallurgy or Chemical Engineering, Associateship of the Royal Institute of Chemistry, or the Institution of Metallurgists, Corporate Membership of the Institute of Chemical Engineers, or equivalent qualifications. Candidates need have no specialised knowledge of the chemistry of radio-active elements. Facilities exist for training in factory administration and there will be opportunities for promotion.

Salary for Works Chemists will be assessed according to age and experience, within the range £330-£720 per annum, and for Technical Assistants according to age, within the range £330-£570 per annum.

Applications to **Ministry of Supply, D.At.En. (P), Risley, nr. Warrington, Lancs.,** stating post applied for and location preferred.
RS.3305-JO-20.

SITUATIONS VACANT

PLANT DEVELOPMENT AND PROCESS ENGINEERS, qualified in Chemical Engineering or Petroleum Refining Technology, required by Bahrein Petroleum Company, Limited. Age limit, 25-40. Two-year agreement periods with passages and paid leaves. Free air-conditioned accommodation, board and medical attention, kit allowance, low living costs. Salary according to experience. Write, with full particulars of age, education, experience, to **Box 3784, c/o Charles Barker & Sons, Ltd. 31, Budge Row, London, E.C.4.**

FOR SALE

600

TWIN roll **FLAKING MACHINE** by **BERTRAM,** with C.I. rolls 60 in. long by 28 in. dia. Drive through helical gearing from 4.5 h.p. reduction gearbox, ratio 160/35, with pulley. Rolls suitable 40 lb. W.P.

STAINLESS STEEL EQUIPMENT in stock for immediate delivery. Storage vessels up to 1,000 gall., heating and cooling coils, buckets, portable stirrers, tables, measures, scoops, funnels, etc.

New portable **TROUGH BELT CONVEYOR** 30 ft. centres by 16 in. wide, discharge height 10 ft. to 12 ft.

New portable **WOODEN SLAT CONVEYOR** 15 ft. centres by 21 in. wide, discharge height 6 ft. to 11 ft.

Stainless steel horizontal **VESSEL,** 6 ft. long by 3 ft. 5½ in. diam., one end hinged with quick-release bolts, fabricated from 10G. 15 in. manway on top, lagged with cork. Dull polished, mounted on trolley.

Steam heated **DRYING OVEN** by **AIRSCREW,** continuous type, twin compartment 50 ft. long. Air circulation and heat control. 30/50 lb. W.P. 3,000 to 4,000 lbs. evaporation. Trolleys mechanically hauled.

GEORGE COHEN SONS & CO. LTD.
SUNBEAM ROAD, LONDON, N.W.10.
Tel. ELGar 7222 and
STANNINGLY, Nr. LEEDS.
Tel.: Pudsey 2241.

BRAND New Hardwood **LABORATORY BENCHES,** 12 ft. by 2 ft. 6 in. by 3 ft. **C. I., Ltd., Staffa Works, Staffa Road, LEYTON, E.10.**

CHARCOAL, ANIMAL and **VEGETABLE,** horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD.,** "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hilljones, Bochurch, London," Telephone: 3285 East.

FULL STEAM IN FIVE MINUTES with B. & A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available; can go beside machines using steam. Write for Leaflet 126, **Bastian & Allen, Ltd., Ferndale Terrace, Harrow, Middlesex.**

METAL POWDERS—Minerals and Chemical Colours **DOHM, LTD.,** 167, Victoria Street, S.W.1.

FOR SALE

VARIOUS MIXERS FOR SALE

BAND CONVEYOR, 50 ft. long 40 in. wide, steel frame, motorised, for boxes, cases, bags, etc.

A FILTER PRESS, 31½ in. square, fitted with 42 C.I. plates, centre fed.

FILTER PRESS, 25 in. square, fitted with 24 plates, cast iron built and steam heated.

Four GARDNER HORIZONTAL MIXERS, for powders, from 100 lbs. to 250 lbs. capacity, all motorised, three with Radicon Reduction Gear Boxes and one with a Spur Gear Drive.

Two large unjacketed WERNER MIXERS, belt and gear driven, hand tipping, double " Z " arms, pans 53 in. by 45 in. by 36 in. deep.

No. 200 One nearly new WERNER PFLEIDERER JACKETED MIXER OR INCORPORATOR. Low type, with C.I. built mixing chamber, 28 in. by 29 in. by 27 in. deep, with double " U "-shaped bottom which is jacketed, and double fish-tail or fin-type agitators geared together at one side, with belt-driven friction pulleys, 34 in. diam. by 5 in. face, with hand-wheel operation and hand-operated screw tilting gear. Machine fitted with machine-cut gears, covers, gear guard, cast-iron baseplate, and measuring overall approximately 7 ft. by 6 ft. by 4 ft. high to the top of the tipping screw.

No. 204 One WERNER PFLEIDERER MIXER OR INCORPORATOR, similar to the above, with a C.I. built pan 25 in. by 25 in. by 19 in. deep, belt pulleys 26 in. diam. by 5 in. face, double fin-type agitators, and mounted on C.I. legs.

No. 208 One DITTO by WERNER PFLEIDERER, with a C.I. built pan or mixing chamber, of the double " U " type, 4 ft. 5 in. long by 3 ft. 8 in. by 33 in. deep, with double " Z " mixing arms, gears at each end, hand-operated tilting gear, with steel backframe, counterbalancing weights and chains, and fast and loose pulleys 3 ft. diam. by 6 in. face.

No. 209 One HORIZONTAL " U "-SHAPED MIXER, steel built, riveted, measuring about 8 ft. 3 in. long by 3 ft. wide by 3 ft. 3 in. deep, with horizontal shaft, fitted with bolted-on mixing arms about 18 in. long by 4 in. wide, with intermediate breakers, and driven at one end by a pair of spur gears, with countershaft, fast and loose belt pulleys, outer bearing and plug cock type outlet at the opposite end, mounted on two cradles fitted to two R.S.J. running from end to end.

No. 210 One HORIZONTAL MIXER as above.

No. 211 One HORIZONTAL MIXER as above.

These three " U "-shaped mixers are in some cases fitted with steel plate covers and a steam jacket round the bottom and extending to within about 18 in. of the top with plain end plates.

Further details and prices upon application.

Write RICHARD SIZER LIMITED, ENGINEERS CUBER WORKS, HULL

1000 STRONG NEW WATERPROOF APRONS. To-day's value 5s. each. Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons Springfield Mills, Preston, Lancs Phone 2196.

FOR SALE

MORTON, SON & WARD, LTD., offer

MIXERS, ETC.

THREE Horizontal Totally Enclosed **MIXERS,** measuring 9 ft. long by 3 ft. 6 in. in diameter, constructed welded ½ in. plate, manhole and discharge; motorised or fast and loose pulley drives. Arranged for steam jacket if required.
MORWARD " U "-shaped **MIXERS** with scroll-type agitators, electrically driven through reduction gears; sizes 4 ft., 6 ft. and 8 ft. long.
SIX 200-gallon Vertical **MIXERS,** unjacketed, fitted with stirring gear, driven through bevel gears from fast and loose pulley drives.
HYDRO EXTRACTORS: A large selection in stock from 72 in. to 30 in., all electric.

Specific plant inquiries invited.

MORTON, SON & WARD, LIMITED, WALK MILL, DOBCROSS, NR. OLDHAM, Lancs. 'Phone Saddleworth 437.

GRAVITY CONVEYORS, rollers 24 in., 18 in., 14 in. and 9 in. wide on 6 in. and 4 in. pitch, with curves and stands.
PORTABLE SLAT CONVEYORS. Oak slats, 17 in. wide by 22 ft. long, adjustable delivery height, 4 ft./14 ft., for bags or boxes, etc.
Copper-lined **STEAM JACKETED PAN,** 25 gals. on three legs.
Vertical Cross-tube **STEAM BOILER,** 8 ft. 6 in. by 3 ft. 6 in. diam., 80 lb. w.p.
KIMMINS & SONS, Lyndhurst Road, Worthing.

'PHONE 98 STAINES

" **WEIR** " and " Serck " **CONDENSERS** from 4 ft. by 6 in. diam., up to 7 ft. by 1 ft. 6 in. diam. (Some unused.)
" Torrance " 7 ft. diam. **EDGE RUNNER** (Electric).
Jacketed " **U** " **TROUGH MIXERS**—9 ft. by 8 ft. by 7 ft. 10 in. deep and 6 ft. 6 in. by 3 ft. 3 in. by 4 ft. 3 in. deep.
B.P. Jacketed **TIPPING TWIN-BLADE MIXERS,** 30 in. by 28 in. by 28 in., 400/3/50.
HARRY H. GARDAM & CO., LTD., STAINES.

SLASH deadweight—increase insulation—" **DOHM VERMICULITE** " for concrete, plastering and loose fill in schools, flats, factories, power stations and kilns. **DOHM, LTD.,** 167, Victoria Street, London, S.W.1.

THIODIGLYCOL. Any quantity from a single 45 gallon drum up to 100 tons. **SODIUM LACTATE** 50% **TECHNICAL DARK,** any quantity from a single 45 gallon drum up to 30 tons. WILLIAMS, 203, Albany Street, London, N.W.1. EUSton 4804.

UNUSED 40 in. **EDGE RUNNER MILL,** 8/8 pan and scraper, granite wheels and bed.
New **SOAP PLODDER,** 5 in. Henry Simon, 8/8 cylinder, motorised.
Unused Johnson **FILTER PRESS,** 6 timber plates and frames, 9 in. × 19 in.
Four **FILTER PRESSES,** 70 plates each 24 in. × 24 in. with two large accumulators.
Dawson **BOTTLE-WASHING MACHINE,** 30 bottles per minute with 8/8 filler head.
Beer Bottle-type **LABELLING MACHINE.**
Heavy Copper **HORIZONTAL PRESSURE MIXING VESSELS.** Size 42 in. × 18 in., 60 in. × 30 in., 81 in. × 30 in., with geared motors.

REED BROTHERS (ENGINEERING) LIMITED, REPLANT WORKS, CUBA STREET MILLWALL, E.14. 'Phone EAST 4081.

FOR SALE

3 M.S. Welded Jacketed **PANS**, 24 in. diam. by 26 in. deep, 1½ in. bottom outlet, mounted on angle legs. Tested 100 lb. hydraulic pressure.

THOMPSON & SON (MILLWALL) LIMITED
CUBA STREET, LONDON, E.14.
Tel.: East 1844.

8 COPPER-jacketed **MELTING PANS**, 18 in. diam. by 12 in. deep, nted covers, mounted in M.S. frames 25 in. by 25 in. by 44 in. high, with flanged fittings, valves and steam traps. As new.

THOMPSON & SON (MILLWALL) LIMITED,
CUBA STREET, LONDON, E.14.
Tel.: East 1844.

WANTED

ONE VERTICAL MULTITUBULAR COCHRAN BOILER OR SIMILAR, working pressure 100/150 lb. per sq. in. Evaporative capacity, 4,000 lb. per hour. Replies to **James Wilkinson & Son, Ltd., Tinsley Park Road, Sheffield, 9.**

WORKING NOTICE

THE Proprietor of British Patent No. 475041, entitled **"A PROCESS OF TREATING MATERIAL BY HEAT,"** offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to **Singer, Stern & Carlberg, 14 E. Jackson Boulevard, Chicago, 4, Illinois, U.S.A.**

SERVICING

CRUSHING, GRINDING, MIXING and **DRYING** for the trade.
THE CRACK PULVERISING MILLS, LTD.
49/51, Eastcheap, E.C.3
Mansion House, 4408.

GRINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Supplier of Ground Silica and Fillers, etc. **JAMES KENT, LTD.,** Millers, Fenton, Staffordshire. Telegrams: Kenmill, Stoke-on-Trent. Telephone: 4253 and 4254, Stoke-on-Trent (2 lines).

GRINDING of every description of chemical and other materials for the trade with improved mills. **THOS. HILL-JONES, LTD.,** "Invicta" Mills, Bow Common Lane London, E. Telegrams: "Hilljones, Bochurch, London," Telephone: 3285 East.

AUCTIONEERS, VALUERS, Etc.

EDWARD RUSHTON, SON AND KENYON
(Established 1855).

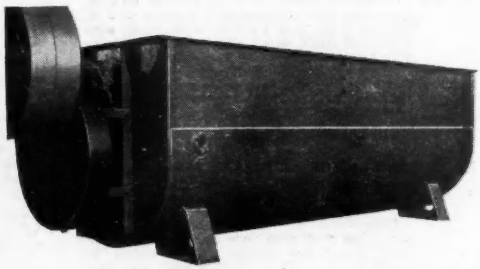
Auctioneers Valuers and Fire Loss Assessors of
CHEMICAL WORKS, PLANT AND
MACHINERY
York House, 12 York Street, Manchester.

Telephone 1937 (2 lines) Central, Manchester

DEXTRINE AND BRITISH GUM PROCESSING

THIRD STAGE: COOLING

After starch has been converted to Dextrine (or Gum), cooling is necessary before dressing and bagging. The Belt driven Cooler illustrated is fitted with a cold water jacket, and has a triple spiral shaft circulating the Dextrine during temperature reduction. These coolers are also made circular and totally enclosed, with electric drive.



We manufacture complete plant for producing Dextrines and British Gums, including

ACIDIFIERS, PRE-DRIERS, BLENDERS, FURNACES AND FANS, ELEVATORS AND CONVEYORS

POTT, CASSELS & WILLIAMSON

MOTHERWELL · SCOTLAND

CASKS AND DRUMS

CONTAINERS ARE AN ESSENTIAL PART *OF YOUR BUSINESS, AND WE ARE KEEN TO OFFER YOU OUR PERSONAL ATTENTION TO YOUR SPECIAL REQUIREMENTS.*

IT IS OF THE UTMOST IMPORTANCE *THAT YOUR PACKAGES REFLECT THE CARE AND ATTENTION YOU HAVE GIVEN TO THE CONTENTS. OUR COOPERAGE AND DRUM RECONDITIONING DEPARTMENTS ARE STAFFED BY CRAFTSMEN AND ENTHUSIASTIC WORKERS. PROMPT DELIVERIES AND COMPETITIVE RATES AWAIT YOUR ESTEEMED INQUIRIES FOR HOME AND EXPORT TRAFFIC.*

S. GIRLING & SONS (COOPERS) LTD.

BARREL & DRUM MERCHANTS

59 LEA BRIDGE ROAD : : LEYTON : : E. 10.

TELEPHONE : LEYTONSTONE 3852.

Controlled by The Staveley Coal & Iron Co., Ltd.

VACUUM PUMPS

For Medium and Ultra High Vacuum

Laboratory and Industrial sizes

Lennox Foundry Co. Ltd.

Glenville Grove, London, S.E.8

BELTING

AND

ENDLESS VEE ROPES

Superlative Quality

Large Stocks - Prompt Despatch

FRANCIS W. HARRIS & Co. Ltd.

BURSLEM - Stoke-on-Trent

'Phone : Stoke-on-Trent 87181-2

'Grams : Belting, Burslem

JOHN KILNER & SONS (1927) LTD

ESTABLISHED 1867

Calder Vale Glass Works, Wakefield, Yorks.

PHONE: WAKEFIELD 2042 'GRAMS: GLASS, WAKEFIELD

SPECIALISTS IN

Carboys · Demijohns Winchesters

BRONZE & ALUMINIUM

FOUNDERS

TO THE CHEMICAL INDUSTRY

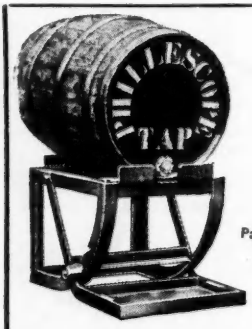
CHILL CAST PHOSPHOR BRONZE BAR

●

E. JACKSON & CO.

LORD STREET, MANCHESTER, 10

Telephone : Collyhurst 3016



Patent No. 376029

"SECO" PATENT TILTING BARREL & DRUM STAND

Enables one man to handle into position barrels and drums of up to 60 gallon capacity, which can also be lowered into the draining and loading positions by operating the foot lever. Container can be completely drained without de-mounting.

THE STEEL EQUIPMENT CO., LTD.,
Greets Green, West Bromwich, Staffs.
Telephone : Tipton 1137/8/9.
Grams : 'EQUIPIT' W. BROM

L.G.B.

Drying Trays

- IN HARD RESISTANT VITREOUS ENAMEL
- SPECIALLY PROCESSED TO GIVE MAXIMUM SERVICE
- ALL CORNERS AND EDGES ROUNDED
- SIZES TO SUIT CUSTOMERS REQUIREMENTS
- FINISHED IN GREEN OR OTHER SELECTED COLOUR

NATIONAL ENAMELS LTD.
53, NORMAN ROAD, GREENWICH
LONDON, S.E.10.
Telephone Greenwich 2266-7 and 2429

Mirvale

MIRVALE

Cresylic Acid

CRESOLS, PHENOL
HIGH BOILING TAR ACIDS
CRESYLIC CREOSOTE
NAPHTHALINE, PYRIDINE

MIRVALE CHEMICAL CO. LIMITED
MIRFIELD, YORKS. Phone Mirfield 2157

CALLOW ROCK

Gas-Burnt

LIME

for all purposes

• • •

QUICKLIME
(*Calcium Oxide*)
of the highest commercial quality, in lumps or in coarse powder form

HYDRATED LIME
(*Calcium Hydroxide*)
In Standard and Superfine grades to meet most industrial requirements

• • •

The Callow Rock Lime Co. Ltd.
CHEDDAR, Somerset

Agents: DURHAM RAW MATERIALS, LTD., 1-4, Great Tower Street, LONDON, E.C.3.

GRINDING

Grading, Mixing, Sieving or Separating and Drying of materials, etc., undertaken for the trade

Also Suppliers of
GROUND SILICA, FILLERS, AND CHEMICALS

JAMES KENT
LIMITED • MILLERS

MANOR STREET, FENTON
STAFFORDSHIRE
Phone: Stoke-on-Trent 48835/6/7 (3 lines) Grams: Kenmil, Stoke-on-Trent

"STILL LEADING"
For CHEMICAL & ALLIED TRADES
ACID RESISTING
CEMENTS & LININGS
For PICKLING TANKS, FLOORS, DIGESTERS, KIERS, STONE, CONCRETE, BRICK, WOOD, IRON VESSELS & ACID TOWERS

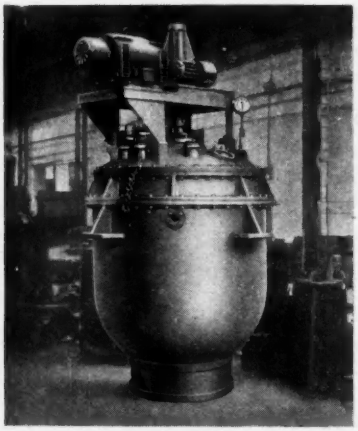
PICKLING TANKS 60 FEET LONG WORKING SUCCESSFULLY
AN ALL BRITISH PRODUCT

RIZISTAL

RIZISTAL TRADE MARK

RESISTS
Formaldehyde, Alcohol, Oils, Greases and Tar Acids, Benzene, Toluene Compounds HCl, H_2SO_3, HNO_3, and H_3PO_4 mixed HNO_3 and HF Acids, Aqua Regia, Formic, Acetic, Lactic, Oxalic, Chromic Acids, Bisulphites, Hypochlorites, Mixed Acids, Peroxides, Nascent Halogens and Alkalies.
UNDER STEAM PRESSURES

SOLE MAKER *OVER 50 YEARS' EXPERIENCE*
JOHN L. LORD
WELLINGTON CEMENT WORKS
TELEGRAMS: "CEMENT" PHONE: BURY 617
BURY, LANCASHIRE



MIXING VESSELS

Cast-iron, Steam-jacketed, Closed Type. Lined with Hard Acid-resisting Glass Enamel.

Capacities, 5 to 1,000 gallons. For processing concentrated Foods, Meat Extracts, etc. The Lining is guaranteed free from Lead or Antimony.

T. & C. CLARK & CO., LTD.
SHAKESPEARE FOUNDRY · WOLVERHAMPTON
Telegrams: "Clark," Wolverhampton. Telephone: 20204/5
ESTABLISHED OVER A CENTURY AND A HALF

Printed in Great Britain by THE PRESS AT COOMBELANDS Ltd., Addlestone, and published by BENN BROTHERS LTD., at Bouverie House, 154, Fleet Street, E.C.4, 23 December, 1950. Registered at the General Post Office. Entered as Second Class Matter at the New York, U.S.A., Post Office.